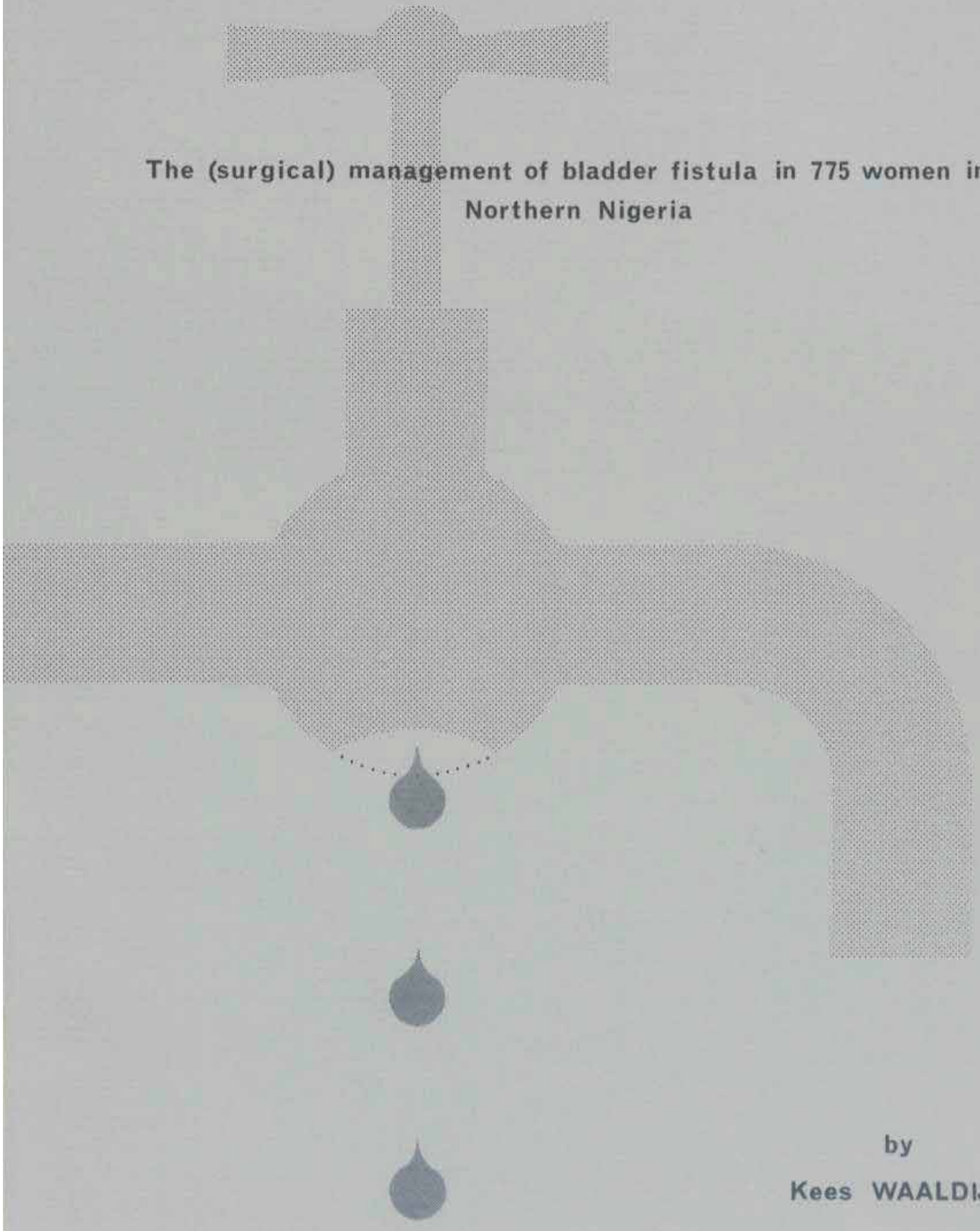
The (surgical) management of bladder fistula in 775 women in Northern Nigeria



by

Kees WAALDIJK

The (surgical) management of bladder fistula in 775 women in Northern Nigeria

De (chirurgische) behandeling van blaasfistels bij 775 vrouwen in Noord Nigeria

(met een samenvatting in het Nederlands)

proefschrift

ter verkrijging van de graad van doctor aan de Rijksuniversiteit te Utrecht,
op gezag van de Rector Magnificus Prof. Dr. J. A. Van GINKEL,
ingevolge het besluit van het College van Dekanen
in het openbaar te verdedigen op woensdag 6 december 1989
des namiddags 4.15 uur

door

Kees WAALDIJK

geboren op 13 september 1941 te Amsterdam

Promotores

Prof. Dr. A. A. HASPELS

Prof. Dr. T. K. A. B. ESKES

Cover and drawings by Coen De GROOT

Photography by the author

"Carried by her mother and her grandmother this 14-year-young girl was brought into the examination room smelling offensively. Cachectic from the enormous effort and trauma it had taken her to deliver over a period of 4 days a dead male infant without professional help in the bush, she was too weak to support herself; also she had developed bilateral drop feet. The very offensive smell was due to the continuous leaking of urine per vaginam from an extensive urethrovesicovaginal fistula and to the passing of diarrheic stools per vaginam from an extensive rectovaginal fistula with total perineal rupture and sphincter ani rupture; the cervix and uterus could not be identified, most of the paraurethral, deep transverse perineal and levator ani muscles were gone, and the labia minora were (sub)totally lost; in fact she presented with one big cloaca. She had as well deep pressure ulcers over the sacrum and both major trochanters; the wounds over the scapulae had healed off with scar tissue. She did not remember very much as she had been unconscious or semiconscious most of the time. What a change from the proud girl who had been married 3 years ago to an elderly man who did not want to have his wife around anymore. The only proud thing about her now were her breasts, unbelievably still young and full as if nothing had happened, reminding us that this was a young girl whose adolescent and adult life had been wrecked at a time when it should have had started."

own observation

To all fistula women in the world

acknowledgment

Herewith I would like to thank all my teachers, too many to mention them separately. From all of them I learned a lot; from the one how to do something and from the other how not to do something.

Special appreciation to Drs. Reginald and Catherine HAMLIN at the Fistula Hospital for Poor Women in ADDIS ABABA, Ethiopia. In 1983 they showed me 3 VVF-repairs, and in 1985 I spent 4 weeks with them to learn how to handle the difficult cases. I was and still am highly impressed by their dedication.

All the staff of Babbar Ruga Hospital in KATSINA are thanked for their efforts to help the VVF-patients.

Thanks to the YAR'ADUA family of KATSINA for donating a high-quality 38-bed postoperative VVF-ward.

The government of Katsina State is thanked not only for their financial involvement, but especially for their continuous moral support.

Special thanks to Prof. Dr. T. K. A. B. ESKES who taught me how to examine a patient properly and how to proceed systematically.

Last of all I would like to thank Prof. Dr. A. A. HASPELS for his enthusiasm which in 1984 stimulated me to proceed with this thesis and for his critical evaluation of the results.

list of abbreviations

UVF	=	urethrovaginal fistula
UVVF	=	urethrovesicovaginal fistula
U(V)VF	=	urethro(vesico)vaginal fistula
(U)VVF	=	(urethro)vesicovaginal fistula
VCF	=	vesicocervical fistula
VCUVF	=	vesicocervicouterovaginal fistula
VCVF	=	vesicocervicovaginal fistula
VUF	=	vesicouterine fistula
VUVF	=	vesicouterovaginal fistula
VVF	=	vesicovaginal fistula
RVF	=	rectovaginal fistula
CS	=	cesarean section
EUO	=	external urethra opening
UV-junction	=	urethrovesical junction
i.m.	=	intramuscular
i.v.	=	intravenous
Ch	=	Charriere
G	=	gauge
min	=	minute
hr	=	hour
wk	=	week
mth	=	month
yr	=	year

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Chapter I
introduction, general lay-out and objectives

a. introduction

The occurrence of bladder fistulae in females resulting in uncontrollable leaking of urine is as old as mankind and has been a constant source of misery to the women affected.

The abnormal connection (=fistula) may be between the urethra and the vagina, between the bladder and the vagina, between the bladder and the cervix canal, between the bladder and the uterine cavity or between the ureter(s) and the vagina; other exceptional fistulae are possible, as well as a combination of the different types (Fig.1-4).

The general term vesicovaginal fistula (VVF) is used because urine is leaking from the vagina.

The causes can be divided roughly into the following categories: obstetrics, surgery, malignancy, trauma, infection, radiation and congenital malformation. The obstetric fistulae constitute by far the largest group accounting for more than 85% of all patients in the world.

The size of the fistula may vary from very small with only occasional leaking when the bladder is full to very extensive with total loss of the bladder floor and the urethra (Fig. 5-8).

Especially in the obstetric group there is a frequent combination with other lesions such as rectovaginal fistula (RVF), loss of pelvic floor muscles, vaginal stricture or stenosis, peroneal paralysis, pressure ulcers and cachexia.

The social implications are far reaching (HARRISON, 1983). Due to the constant dribbling of urine, the wetting of their clothes and the accompanying smell, most communities consider these women as outcasts. If no cure is obtained within a short period of time, their husbands divorce them, and they end up as low-cost prostitutes when young and as beggars later on. Sometimes they are not even allowed to live in the village, but outside in so-called women's houses, as people think the condition is infectious.

Though exceptionally the fistula may heal spontaneously, with or without the help of an indwelling bladder catheter, the majority of the VVF-patients can only be helped, if at all, by surgical intervention.

But even if the fistula itself has been closed, there remain some other serious problems such as urinary (stress) incontinence, vaginal stenosis or even atresia, and infertility. Only if all these problems have been solved, can the patient be restored to a normal social life.

However, as a definite solution cannot always be found, it is clear that some patients have to live socially and physically crippled until they die.

Since the development of modern obstetrics and gynecology, the VVF has disappeared more or less in the industrialized world, and nowadays it is a rarity there. Also there has been a shift from obstretric towards surgical fistulae, if encountered (FALK, 1963; SYMMONDS, 1984; HASPELS, 1988).

Due to sociocultural patterns and lack of health facilities, manpower and professional skill, the VVF continues to be a major social and medical problem in the developing countries.

The general public and most medical workers in the industrialized world are not aware of this and are underestimating the problems involved, as they are no longer confronted with these patients.

Though reliable epidemiologic data are not available, there are hundred thousands of VVF-patients in the world, and a low estimate would be five hundred thousand. Their number is even increasing, because the population is increasing rapidly without a concurrent increase in health facilities.

It will be a major public health problem for many years to come, as funds are missing to set up an adequate network of good obstetric/gynecologic care throughout the world, as it will take a long time to change sociocultural patterns and as the industrialized world is not really interested in it.

It lasted till 1663 before the first operative procedure was described. A short chronologic review of the most important literature, as compiled from a thesis by NOREL (1956), an article by MAHFOUZ (1957), a thesis by KAMARA (1983) and a book by ZACHARIN (1988), is given:

In 1663, Hendrick van ROONHUYSE was the first to describe a surgical technic for repair of VVF with the following principles: lithotomy position of the patient, good exposure of the fistula with a speculum, marginal denudation of the bladder wall and approximation of the denuded edges with sharpened stiff swan's quills. This gave a start to the repair of VVF by operative procedures, and his principles are still of value.

In 1679, VOELTER introduced the use of an indwelling bladder catheter and interrupted sutures either from hemp or silk.

In 1752, FATIO for the first time published details of 2 successful VVF-operations.

In 1766, LEVRET suggested the knee-elbow position for repair of the fistula.

In 1779, MITCHEL reported spontaneous healing of a fistula following treatment with a flexible indwelling bladder catheter.

In 1813, JAMES suggested the use of an elastic indwelling bladder catheter to aid spontaneous healing, and he advised the use of a caustic when the fistula was small.

In 1817, SCHREGER described the successful use of interrupted silk sutures in repairing the fistula.

In 1829, DUPUYTREN recommended cautery for small fistulae; also he dissected the anterior vaginal wall from the bladder.

In 1834, GOSSET described and advocated the use of silver gilt wire sutures for closure of fistulae.

In 1845, De LAMBALLE propagated dissection of the bladder from the cervix in order to reduce the tension on the suture lines.

In 1848, MAISONEUVE described incision of the perineum at the left side of the rectum and extending the incision upwards to obtain good accessibility; he also mobilized the bladder.

In 1852, the great breakthrough came when James Marion SIMS published his classical article on the operative treatment of vesicovaginal fistula. Though none of his innovations were new, his perseverance led to success using the duck spoon speculum, the knee elbow position, and later the left-sided knee elbow position, the marginal denudation of the fistula edge and the one-layer closure with silver wire sutures; he also used an indwelling bladder catheter. He operated 30 times on Anarcha, his first patient, to get his first cure, and only after he changed from silk to silver as suturing material. He perfected his technic together with his assistant EMMET. He can be considered the father of modern gynecology.

In 1852 WUETZER reported cure in his patient Lucie STICH following 33 procedures.

In 1854, SIMON described the exaggerated lithotomy position and a second layer of sutures to remove the tension; later on he also described transverse colpocleisis.

In 1859, BAKER-BROWN devised a self-retaining dilating speculum and recommended the use of episiotomy.

In 1861, COLLINS advocated the flap-splitting technic whereby the anterior vaginal wall is widely dissected from the bladder.

In 1868, EMMET published a technic for urethra reconstruction, but the results were not successful.

In 1881, TRENDELENBURG described a suprapubic transvesical approach dissecting the bladder from the anterior vaginal wall.

In 1882, PAWLIK advocated the catheterization of the ureters to avoid damage to them during fistula repair.

In 1887, FRITSCH recommended an artificial vesicovaginal fistula with catheter through it to drain the bladder postoperatively.

In 1890, MARTIN dissected vaginal flaps around the fistula, inverted them into the bladder and closed the defect with them.

In 1893, SCHUCHARDT devised the parasacral incision which was later used in obtaining a better accessibility of the fistula.

In 1893, Von DITTEL reported about an abdominal approach to repair the fistula.

In 1894, MACKENRODT suggested wide mobilization of the anterior vaginal wall from the bladder and then separate closure of the two defects. Others, e.g. DUPUYTREN, MAISONEUVE and COLLINS, had already made the same suggestion before him.

In 1897, BISHOP stressed the importance of inversion of the dissected bladder wall at closure of the defect.

In 1901, NOBLE successfully reconstructed the urethra by suturing mobilized lateral flaps around a small catheter and covering this with a flap from the labium minus.

In 1902, KELLY recommended opening the peritoneum widely in high vesicovaginal fistulae following hysterectomy and mobilizing the bladder from its fixation to the vaginal vault before closure.

In 1908, KELLY reconstructed the urethra by preparing a tunnel and using a pedicled flap from the anterior vaginal wall for lining it. The tunnel method had been devised by BAKER BROWN in 1863 and was later perfected by McARTHUR (1912), by FARRAR (1923) and by GEIST (1940).

In 1914 and 1942, LATZKO described a very effective technic for vesicovaginal fistulae following total hysterectomy by partial colpocleisis of the vaginal vault. His technic has become standard for this type of fistulae.

In 1918, FUETH innovated the collar method whereby from the anterior vaginal wall surrounding the fistula a collar was formed which following flap splitting was pushed into the bladder as a cork.

In 1928, 1932 and 1954, MARTIUS described grafting following closure of the bladder/urethra first using pelvic floor muscles and later the bulbocavernosus fat/muscle. His technic has become very popular as "the risk is low, the gain is high".

In 1928, GARLOCK reported closure of a urethrovesicovaginal fistula using the gracilis muscle as a pedicled graft via a transvulval incision, but continence was imperfect.

In 1929, HILDEBRANDT described the interposition of omentum majus in closing extraperitoneal bladder defects. Later, BOUWDIJK BASTIAANSE (1940, 1941, 1946 and 1960) reintroduced this technic for radiation fistulae.

In 1929, 1930, 1938, 1949 and 1957, MAHFOUZ reported about his vast experience in treating urogenital fistulae using the flap-splitting technic without removing any vaginal or bladder tissue. He has operated some 1,200 patients.

In 1940, 1947, 1956, 1957, 1961, 1964, 1965 and 1966, CHASSAR MOIR reported about his experience using a modified SIMS technic, whereby meticulous closure of the anterior vaginal wall was essential.

In 1948, 1953 and 1960, INGELMAN-SUNDBERG discussed a variety of grafting technics using the pubococcygeus, the bulbocavernosus, the rectus abdominis and the gracilis muscles. The gracilis muscle was tunneled via the obturator foramen.

In 1969, HASPELS successfully used the intact pubococcygeus muscles in plastic repair of fistulae involving the sphincter.

In 1969 and 1980, TANAGHO described a technic for surgical correction of incontinence by constructing a neourethra out of a flap from the anterior bladder wall.

In 1969, HAMLIN and NICHOLSON reported about their technic for urethra reconstruction using the gracilis muscle tunneled subcutaneously into the vagina via the same route as the bulbocavernosus fat/muscle. They have the largest experience in VVF-surgery in the world having operated some 10,000 patients.

In 1969, 1978 and 1984, SYMMONDS published his experience in reconstructing the urethra.

In 1980, WARD reported about her experience in 1,789 patients with vesicovaginal fistulae.

b. general lay-out

My main work is leprosy control and leprosy care together with major and reconstructive (leprosy) surgery. In 1983, by "chance" I came across VVF-patients in large numbers, and I was shocked to find out that these women were even more social and medical outcasts than leprosy patients. Pressed by my staff, by the patients themselves and by their suffering, I decided to undertake this type of (reconstructive) surgery as well, since I had attended in January 1983 a VVF-repair session by the HAMLINs in Ethiopia.
In January 1984 a start was made, and within the 5-year period 1984-88, a total of 1,110 VVF-repairs and related operations were performed in 942 patients, an indwelling bladder catheter was inserted to try "spontaneous" healing in 100 patients and 82 RVF-repairs were done in 69 patients. So within a short period of time more than 1,000 VVF-patients have been treated, and from a "hobby" it became an integrated part of my work.
In those 5 years all the patients coming to the hospital have been treated, except for 3 where the damage was so extensive that they could not be helped at all.

This thesis is based on the personal experience obtained in all these patients who irrespective of the damage were operated in a more or less chronologic order of their presentation.

All the following were done by one person with the help of indigenous hospital personnel: anamnesis, preoperative assessment, spinal anesthesia, pre- and postoperative blood pressure monitoring, photography, surgery, postoperative check-up and systematic documentation.

The documentation consisted of typed out operation reports with name, age, address, history, diagnosis, operation, duration of operation, name of surgeon and assistant, type of anesthesia, anesthetic drug used, detailed operation report with hand-made schematic situation drawing, blood pressure measurements and postoperative check-ups. From operation No. 258 in patient No. 230 a systematic photographic documentation of the fistula was done by color pictures and color slides.

Babbar Ruga Hospital was built in 1931, basically for leprosy patients in a rural area; however, general patients were treated as well on an outpatient base. It is situated outside KATSINA Town, the capital of Katsina State, in the central upper north of Nigeria. Katsina State, one of the twenty-one states of Nigeria, covers an area of 23,400 sq km and has officially a population of 4.7 million people. There are two main tribes, the hausa and the fulani, and more than 95% of the population are muslims. As it is a government hospital, treatment was free of charge. The conditions under which the patients have been operated were primitive, as there was no electricity supply, no reliable water supply, no laboratory and no X-ray facilities.

c. objectives

The prevalence of VVF is high, but the actual incidence is not known and very little is being done for these patients in developing countries. This is a pity, as by a successful VVF-repair the physical suffering and social embarrassment of the woman will be over. The general objectives (1) and specific medical objectives (2) can be summarized as following:

(1) general objectives

a) to stimulate other medical workers, especially in the developing countries, to undertake more interest in these patients
b) to make the general public in the industrialized coun tries more aware of these problems
c) to show that even under primitive conditions something can be done for VVF-patients
d) to stimulate more field research in VVF
e) to stimulate the foundation of an International Association for Reconstructive Surgery in Developing Countries

(2) specific medical objectives

a) to present baseline data as obtained in the first 500 consecutively operated VVF-patients as to age, cause of fistula, duration of leakage, size and location of fistula, social status, sex/health of infant, parity at which fistula developed etc. for Northern Nigeria
b) to present the results in the first 500 consecutively operated VVF-patients as baseline data for Northern Nigeria
c) to present the results of a personal operation technic in another 150 consecutively operated VVF-patients
d) to present a technic for reconstruction of the anterior vaginal wall
e) to present the results of a urethra reconstruction in another 25 consecutively operated VVF-patients
f) to assess the role of an indwelling bladder catheter in promoting "spontaneous" healing as applied in 100 VVF-patients
g) to stress how simple, effective, safe and cheap spinal anesthesia is in developing countries

Chapter IIa
baseline data in the first 500 consecutive VVF-patients

Whenever a VVF-patient visited the hospital for the first time an extensive history was taken and a vaginal assessment performed. The data obtained could be divided into: a. general baseline data for all 500 patients and b. further baseline data for the 470 patients with an obstetric VVF.

a. general baseline data for all 500 patients

The data were analyzed according to age of the patient, age at which the fistula developed, duration of leaking urine, size of the fistula, location of the fistula, cause of the fistula, previous operation, menstruation and social aspects.

age of patient at first operation in Babbar Ruga Hospital

The age was determined by questioning of the patient and by our own estimation; it was interesting to note that the young girls tended to overstate and the older women to understate their age. Because of the inaccuracy of this method and for simplicity reasons, the number of patients are given in Table I in age groups.

Table I
age categories at (first) operation in Babbar Ruga Hospital

age	number of patients	%
13-15 yr	52	10.4
16-20 yr	232	46.4
21-30 yr	161	32.2
31-40 yr	53	10.6
41-50 yr	1	0.2
51-60 yr	1	0.2
total	500	100.0

Though patients even younger than 10 years of age presented themselves, those were told to come back after menarche, as they were too small for the spinal anesthesia and for the operation.

age at which fistula developed

The age at which the VVF developed was calculated from the age of the patient minus the duration of leaking, as listed in Table II in year categories.

Table II
age at which VVF developed in year categories

age	number of patients	%
0-10 yr	2	0.4
11-15 yr	166	33.2
16-20 yr	199	39.8
21-30 yr	95	19.0
31-40 yr	37	7.4
41-50 yr	-	-
51-60 yr	1	0.2
total	500	100.0

The majority, viz. 365 (73.0%) out of the 500 patients, developed the fistula at the age of 11-20 years. The youngest girl seen was 6 years old who started to leak immediately following a yankan gishiri (salt cut) by the wanzami (traditional barber) when she was 1 week old, and as such has not yet been operated.

duration of leaking at (first) operation in Babbar Ruga Hospital

Though some patients were seen very soon after they had developed a fistula, in this series of 500 patients a minimum interval of 3 months was allowed before operation was undertaken. The duration of leaking urine is presented in Table III.

Table III
duration of urine leakage in years

duration of leakage	number of patients	%
<1 yr	138	27.6
1 yr	66	13.2
2 yr	81	16.2
3 yr	58	11.6
4 yr	44	8.8
5 yr	24	4.8
6-10 yr	74	14.8
11-20 yr	15	3.0
total	500	100.0

size of fistula

The size of the fistula was estimated during operation by taking the largest diameter in any direction in a situation between fully stretched and fully relaxed tissues.

In 60 (12.0%) out of the 500 patients there were multiple fistulae (Fig. 9) and then the diameters were added together.
The fistulae varied in size from very small (less than 1 mm) to very extensive (more than 5 cm), as shown in Table IV.

Table IV
largest size of fistula in any direction

size of fistula	number of patients	%
< 1 cm	80	16.0
1 cm	100	20.0
2 cm	91	18.2
3 cm	61	12.2
4 cm	54	10.8
5 cm	57	11.4
>5 cm	57	11.4
total	500	100.0

location of fistula

The location of the fistula is important in order to know whether or not the closing mechanism is involved. The exact location was determined during operation and written down in a schematic drawing in relation to the external urethra opening, if present, and the cervix, if present, or the vaginal vault.
The fistula was considered to involve the closing mechanism, if the distance between the fistula edge and the external urethra opening was 5-6 cm or less.
Based upon the location of the fistula the patients were divided into two major groups:

I. in 156 patients (31.2%) the closing mechanism of the bladder was not involved; and
II. in 344 patients (68.8%) the closing mechanism of the bladder was involved:
    a) in 288 without loss of the urethra
    b) in 56 with loss of the urethra

cause of fistula

During the 5-year period of this study all types of fistulae have been seen; and only the malignant and congenital fistulae have not been treated and were excluded from this thesis. The causes have been listed in Table V.
Obstetric complications due to obstructed labor were the main cause of the fistulae, viz. in 470 patients (94.0%); cesarean section had contributed to the development of the fistula in 28 patients (5.6%), as a vesicocervicovaginal fistula was found with (partial) loss of the anterior cervix lip.

The yankan gishiri or gishiri cut or salt cut was the cause in 24 patients (4.8%). It was done for a variety of things, but mostly in young girls who did not want to have sex with their elder husbands, as they did not like them; then they were brought by their family to the wanzami claiming that something was obstructing the vagina. The meaning of yankan gishiri seems to be the following. Previously salt was brought into Nigeria in blocks by camel caravans, and if one wanted to have some salt the handlers in the market cut a piece off these blocks straight with a knife. In the same way the yankan gishiri should be performed, whereby almost always the urethra is damaged. Another explanation may be that the vagina is considered to be "the salt of life".
There were 3 patients (0.6%) who had inflicted the VVF themselves. One patient started to leak after she had operated herself with a razor blade because something was coming out of the vagina. One patient started to operate herself with a razor blade because of cystocele and when she was not "successful" she called her elder brother to continue with leaking as a result. One patient developed a VVF after she had introduced a piece of wood into the vagina for reasons unknown.
Miscellaneous causes were listed in 2 patients (0.4%). One patient developed a VVF together with total prolapse of the uterus following a period of diarrhea, and one patient started to leak after she had put "vaseline" into the vagina because of severe itching.
Only one patient (0.2%) presented with a VVF following a vaginal hysterectomy.

Table V
cause of fistula

cause of fistula	number of patients	%
obstetric (no CS contribution)	442	88.4
obstetric (CS constribution)	28	5.6
total obstetric	470	94.0
yankan gishiri	24	4.8
self-inflicted	3	0.6
vaginal hysterectomy	1	0.2
miscellaneous	2	0.4
total nonobstetric	30	6.0
total	500	100.0

previous unsuccessful operation elsewhere

A total of 130 (26.0%) out of the 500 patients had been operated elsewhere from 1 to 4 times without success as shown in Table VI. This makes a total of 170 unsuccessful previous operations.

Table VI
previous unsuccessful operations

number of previous operations		number of patients
	1	99
	2	24
	3	5
	4	2
total	170	130

menstruation

Most patients were menstruating normally; some had become pregnant with a fistula, though most pregnancies ended with abortion; and some were even pregnant at operation. This has not been worked out systematically in this thesis.

urine-induced dermatitis

All the patients with a fistula duration of 1 month or longer showed some kind of urine-induced dermatitis around the vulva (Fig. 10).

social aspects

In taking the history it was only asked whether they were still living together with their husband on the same compound or not, as listed in Table VII.

Table VII
social status

social status	number of patients	%
not living together	409	81.8
still living together	83	16.6
husband died	5	1.0
remarried (with fistula)	2	0.4
never married	1	0.2
total	500	100.0

b. further baseline data for the 470 obstetric fistulae

As the majority, viz. 470 (94.0%) out of the 500 patients, developed a VVF during or following delivery, these patients were analyzed further with the following results.

parity at which fistula developed

In the majority, viz. 288 (61.3%) out of the 470 patients, the VVF developed at the first delivery, though it happened in any parity, from I through XIII, as presented in Table VIII.

Table VIII
parity at which VVF developed

parity	number of patients	%
I	288	61.3
II	52	11.1
III	36	7.7
IV	27	5.7
V	16	3.4
VI	8	1.7
VII	20	4.3
VIII	8	1.7
IX	5	1.1
X	3	0.6
XI	3	0.6
XII	2	0.4
XIII	2	0.4
total	500	100.0

duration of labor

The duration of labor in these 470 women varied from one day up to two weeks, as presented in Table IX. This gives an impression of how these women must have suffered.

Table IX
duration of labor

duration	number of patients	%
1 day	75	16.0
2 days	153	32.5
3 days	98	20.9
4 days	74	15.7
5 days	32	6.8
6 days	14	3.0
7 days	20	4.3
8 days	1	0.2
9 days	2	0.4
2 weeks	1	0.2
total	470	100.0

interval between delivery and onset of leakage

The majority, viz. 397 (84.5%) out of the 470 patients, started to leak immediately following delivery as shown in Table X.

Table X
interval between delivery and onset of leakage

interval	number of patients	%
immediately	397	84.5
1 day	6	1.3
2 days	12	2.6
3 days	10	2.1
4 days	1	0.2
5 days	4	0.8
6 days	6	1.3
7 days	14	3.0
8 days	2	0.4
9 days	1	0.2
10 days	8	1.7
14 days	5	1.1
20 days	3	0.6
40 days	1	0.2
total	470	100.0

sex and condition of the infants born

As there were 7 twin and 1 triple pregnancies, a total of 479 infants were born. The sex of these infants is given in Table XI; in 2 infants the sex could not be determined because they were completely decayed. There was a male:female sex ratio of 2:1.

Table XI
sex of infant

sex	number	%
male	315	65.8
female	162	33.8
unknown	2	0.4
total	479	100.0

The health condition of the infants is given in Table XII. Only 20 (4.2%) out of the 479 infants survived the trauma of obstructed labor, showing a perinatal mortality rate of 95.8%.

Table XII
condition of infant

condition		number	%
dead		459	95.8
alive		20	4.2
	total	479	100.0

When the sex is combined with the condition of the infant, as presented in Table XIII, male and female perinatal mortality was the same.

Table XIII
sex/condition of infant

sex	condition		number	%
male	dead		302	95.9
	alive		13	4.1
		total males	315	100.0
female	dead		155	95.7
	alive		7	4.3
		total females	162	100.0
unknown	dead		2	100.0

location of fistula

Out of the 470 obstetric fistulae, the closing mechanism was involved in 317 patients (67.4%) and in 153 patients (32.6%) it was not involved.
If the 28 cesarean section fistulae are excluded, then out of the 442 obstetric fistulae, the closing mechanism was involved in 317 patients (71.7%) and not involved in 125 patients (28.3%).

successful VVF-repair in the past

Out of the 470 patients, a successful VVF-repair had been performed in the past in 5 patients (1.1%). They presented with a new fistula as again they delivered at home without professional help.

concurrent lesions related to obstructed labor

There was a frequent combination of the obstetric fistula with one or more of the following intravaginal (I) and extravaginal (II) lesions, also related to obstructed labor:

Ia. rectovaginal fistula

There were 60 (12.8%) out of the 470 obstetric patients who had a RVF as well; and 6 of them had been operated already successfully elsewhere. (Fig. 11+12)

Ib. closure of proximal urethra

Closure of the proximal urethra in obstetric fistulae involving the urethrovesical (UV) junction was a frequent finding.

Ic. loss of vaginal muscles and vulval structures

Loss of paraurethral and/or deep transverse perineal and/or levator ani muscles was noted regularly, as well as sometimes loss of labia minora (Fig. 13).

Id. loss of vaginal function

The loss of vaginal function varied from very minor, i.e. only a stricture or some loss of depth, up to very extensive, i.e. stenosis, gross loss of depth and even total atresia. Some loss of function is so frequent that it is forgotten most of the time to be mentioned. (Fig. 14)

Ie. loss of cervix/uterus

Exceptionally, total loss of cervix and uterus was seen in the very extensive fistulae leaving only a band of scar tissue. The cesarean section fistulae always had some more or less extensive loss of the anterior cervix.

IIa. paralysis of the peroneal nerve

Only the (sub)total loss of motor function resulting in drop foot (Fig. 15) was looked for (grade 0, 1 and 2 on the voluntary muscle testing scale).
A uni- or bilateral peroneal paralysis with drop foot was found in 25 (5.3%) of the 470 obstetric patients.
As it may take up to 2 years for the peroneal nerve to recover spontaneously, the patients were divided into two groups.
A (sub)total peroneal paralysis was found in 22 (12.6%) out of the 174 patients with a fistula duration of less than 2 years, and in only 3 (1.0%) out of the 296 patients with a fistula duration of 2 years or longer.
Out of the 22 patients in the first group, already 16 recovered during the postoperative check-up period of 6 months.
No plantar foot ulcers as an indication of sensory loss of the peroneal nerve were seen.

IIb. pressure ulcers over sacrum/major trochanters/scapulae

Though scars over the sacrum were noted frequently whilst giving spinal anesthesia, these scars were thought to be due to burn wounds or some tribal practice, so common in Africa. Until one patient came with deep fresh pressure ulcers over the sacrum (Fig. 16), both major trochanters (Fig. 17) and even both scapulae; these ulcers extended up to the bone. Therefore some of the scars seen must have had the same cause.

IIc. poor general health

The trauma of obstructed labor is so severe that most patients were in a poor state of health immediately following delivery. Most of them improved during the waiting period of 3 months, but one patient had to wait 18 months before she could be operated.

DISCUSSION

No selection has been made in the first 500 consecutively operated patients reported. The data have been obtained and typed out from the beginning, and the history, examination and documentation have been done by one and the same person. Some of these baseline data, like medical and social history, are less reliable because of the situation.

Though the HAMLINs, MAHFOUZ, LISTER and WARD have operated (far) more patients, no large series in the world literature could be found where (complete) baseline data are given, and therefore the baseline data of this thesis could not be compared with available data.

Obstructed labor was the main cause of VVF accounting for 94.0% in this series, including the cesarean section fistulae. The second cause was surgery, viz. cesarean section and hysterectomy, accounting for 5.8%. The third cause was yankan gishiri by the wanzami accounting for 4.8%. The miscellaneous causes accounting for 1.0% were: self-infliction, diarrhea with total prolapse of uterus and "infection".
Some of the women were delivered in a hospital by fetal craniotomy or forceps, of which all data were missing. But as they come very late and a long time is needed in developing countries to arrange for these things, these procedures can be neglected as a cause of VVF in this thesis.
Female circumcision does not play a role in this series, as it is not being practiced in Northern Nigeria.
Some patients with a VVF due to advanced cervix carcinoma were seen, but they were excluded from this thesis.
SERAFINO et al. (1968) found obstetric complications to be the cause in 90.9% out of 320 VVF-patients in Senegal.

The doctors who performed the cesarean section cannot be blamed too much for the development of a surgical fistula considering the poor facilities, the primitive circumstances and the lack of essential materials such as catheters; but especially since the patients come in a very late state when there may be already a rupture of the uterus and/or the bladder.

The yankan gishiri was performed by the wanzami for a variety of things, mostly because the young girls did not want to have sex with their husbands; only 2 out of more than 1,000 VVF-patients seen during the 5-year period presented with a history of yankan gishiri during labor by the unguzoma (traditional midwife). The patients themselves considered an episiotomy during labor in the hospital as a yankan gishiri.

TAHZIB (1983) found that the yankan gishiri was responsible for 13.0% of the fistulae in a series of 1,443 patients in Northern Nigeria.

As more than 90% of the girls/women in the rural areas of Northern Nigeria marry premenarchally (MURPHY, 1981; own observation) under 12 years of age, it is not surprising that the majority, viz. 367 (73.4%) out of the 500 VVF-patients, developed a VVF below the age of 21 years. The young age at which the girls become pregnant might contribute to obstructed labor and as such might contribute to development of a fistula, but it is certainly not the cause. The real cause is that the obstruction of labor is not relieved in time due to lack of health facilities and lack of transport.

Some kind of urine-induced dermatitis was seen in any patient leaking more than 1 month. It resolved spontaneously and completely following a successful VVF-repair.

Contrary to some other reports (NAIDU, 1962; AZIZ, 1965; St GEORGE, 1969), the majority of the patients were menstruating normally.

Out of the 500 VVF-patients, 409 (81.8%) had been sent away by their husbands, and had to live as social outcasts.

A total of 170 unsuccessful previous operations in 130 (26.0%) out of the 500 patients shows that there are many problems involved in the repair of bladder fistulae.

Though most VVFs developed during the first delivery, viz. 288 (61.3%) out of the 470 obstetric fistulae, a respectable number, viz. 182 (38.7%), developed during delivery II through XIII. This makes it quite clear that obstructed labor can occur at any parity whatever the cause.

As the duration of labor varied from 1 day up to 2 weeks, it is no surprise that the majority, viz. 397 (84.5%) out of the 470 patients with an obstetric fistula, started to leak urine immediately following delivery. Even if the 28 cesarean section fistulae are deducted, it is still evident, viz. 369 (83.5%) out of the 442 obstetric fistulae. This is completely contrary to the statement in many textbooks that mostly the leakage starts some days following delivery. Even if it takes some days before the fistula has actually developed, the tissues are already necrotic and nonfunctional. When the closing mechanism is involved, the sphincter is not able to function properly.

The duration of leakage at the time of (first) operation varied from 3 months to over 20 years. The majority, viz. 362 (72.4%) out of the 500 patients, were leaking more than 1 year indicating the nonavailability of a VVF-repair service.
The size of the fistula varied from small to very extensive, and was considered to be small (up through 1 cm) in 180 patients (36.0%), moderate (2-3 cm) in 152 patients (30.4%), large (4-5 cm) in 111 patients (22.2%) and extensive (more than 5 cm) in 57 patients (11.4%). However, the ultimate size of the fistula does not say anything about the actual damage done, as especially in the extensive fistulae there is a strong tendency to scarring which makes the fistula smaller; besides 130 patients (26.0%) had been operated already at least once elsewhere.

There was a frequent involvement of the anterior urethra/bladder wall in the obstetric fistulae. Most of the time there was a circumferential defect of the bladder neck/UV-junction/proximal urethra leading to avulsion of the urethra from the bladder neck and closure of the proximal urethra. As will be seen in Chapter III, a circumferential defect may be found in roughly 50% of the obstetric fistulae involving the closing mechanism. It is important to look for it, as the prognosis becomes worse, if present.

In 3 out of the more than 1,000 VVF-patients seen sofar, there was such an extensive loss of bladder and urethra that no VVF-repair could be undertaken.

As the pressure and thus the eventual necrosis is not only at the anterior vaginal wall, but also at the lateral and posterior vaginal walls, there are more intravaginal lesions related to obstructed labor, mostly in combination with a VVF. The lesions seen were: rectovaginal fistula with or without total perineal rupture in 12.8%; loss of paraurethral, deep transverse perineal and levator ani muscles; loss of the minor labia; and always some loss of anterior vaginal wall leading in many patients to shortening and narrowing of the vagina, even up to severe stenosis and atresia. Exceptionally, there was a total loss of cervix and uterus. In the cesarean section fistulae there was always some loss of anterior cervix.

Frequently, local and systemic extravaginal lesions do accompany the obstetric fistula as has been shown in this thesis.

(Sub)total peroneal paralysis was found in 22 (12.6%) out of the 174 patients with an obstetric fistula duration of up to 2 years and in only 3 (1.0%) of the 296 patients with an obstetric fistula duration of 2 years or longer. This shows the tendency to spontaneous recovery within 2 years which is also demonstrated by the fact that 16 patients of the first group recovered during the 6-month postoperative check-up period. Sensory loss does not seem to occur, as no plantar foot ulcers were seen. The involvement of the peroneal nerve must be higher, at least in 25% of the fresh obstetric fistulae, as minor loss of motor function was not looked for and as most patients were not seen within 6 months following labor. The mechanism is compression of the intrapelvic part of the ischiadic nerve between the fetal head and the maternal bony pelvis.

(Deep) pressure ulcers over the sacrum, major trochanters and scapulae develop infrequently due to compression of the soft tissues between the hard floor and the prominent bones, especially over the sacrum. It may take months for these ulcers to heal.

Due to the trauma of obstructed labor and the protein loss later on, many patients do present themselves in a poor general condition or even cachexia, and some take long to recover.

Though it is not possible to collect data, the trauma of unrelieved obstructed labor is so severe that most of the women die in the process, and only the few "lucky" ones survive.

The trauma to the infant is even worse, as of the mothers who die the infants die as well, and of the mothers who survive most of the infants die, as has been demonstrated in this thesis where 459 (95.8%) out of the 479 infants died perinatally.

The male:female sex ratio of the infants of 2:1 can partially be explained by the heavier birthweight of the males.

Chapter IIb
preoperative preparation, anesthesia, operation methods and post-operative care in the first 500 consecutive VVF-patients

preoperative preparation

Only the first patients were admitted preoperatively to the female leprosy ward, but as the patients were nursed there also postoperatively and the number of patients increased rapidly, this was no longer possible, except for the very weak ones.
A collection of old barns were converted one by one into a "hostel" where the patients could stay preoperatively. Soon it became a community, where they could remain until their first postoperative check-up and where they could stay overnight on further check-ups, as most patients came from far away and transport was expensive. In this "hostel" the patients had to care for themselves such as feeding etc.

All treatment was free of charge; the only thing the patients had to buy in town was a FOLEY catheter on the principle that anyone should spend something for his/her own health.

After examination at their first visit the patients were told to wait their turn for operation in the "hostel". Their name was entered into a list from which they were operated more or less in a chronologic order. They had to wait a minimum period of 3 months from the onset of leaking until they were operated.

To give an impression, more is not possible, of the primitive conditions under which all the patients were operated the following should be noted:

a. there was no electricity supply to the hospital
b. all the operations were performed in normal daylight
c. there was no reliable water supply to the hospital
d. water for sterilization, cleaning, flushing of catheters etc. mainly came from a well
e. there were no laboratory facilities
f. all the patients were operated without any preoperative laboratory investigation
g. there were no X-ray facilities
h. no preoperative radiologic investigation was performed
i. sterilization of the instruments was done in boiling water and of the operation gowns, towels, gauze etc. in a pressure cooker type autoclave on a gas stove

j. due to lack of gloves, no preoperative pelvic examination was done
k. until the opening of a new postoperative VVF-ward in June 1987, all the patients were nursed postoperatively in the female leprosy ward
l. as the nursing care was far from optimal, the patients needed their relatives or other VVF-patients postoperatively to "nurse" them through this important period
m. there was a scarcity of drugs, infusion fluids, gauze, antiseptics etc.
n. inside temperatures ranged from 25 to over 45 C
o. during the dry harmattan season the sand was blowing through the operation theater and through the wards

Only a superficial clinical check-up of heart, lungs, eyes (for gross anemia) and general condition was done the day before the operation, with a vaginal assessment of the fistula.
The patients were instructed at the same time not to eat anything from 24.00 hr onwards and to pass stools the following morning, but most of them did not stick to these instructions.
Shaving of the pubic area and cleansing with soap and whatever antiseptic was available was done in the operation theater just before spinal anesthesia and operation.

anesthesia

Except for the very first operation which was done under general anesthesia in another hospital, all the operations were performed in spinal anesthesia; the anesthesia will be fully described in Chapter V.
Some 25 to 30 min elapsed from the time spinal anesthesia was given until the operation was started due to blood pressure monitoring during 15 min, positioning of the patient on the operation table, photographic documentation and draping with sterile towels.

operation methods

general remarks
All the operations were performed in normal daylight without additional light. Only some 5 days a year it was too dark to carry out any operation.
All the operations were performed by the surgeon and one assistant who was doing the instrumentation as well; there was no need for another assistant.
Normal (vaginal) surgical instruments were used, except for a pair of sharply curved scissors to dissect the anterior vaginal wall from the bladder.
Normal chromic catgut and supramid suturing material was used; never atraumatic material, as it was not available and far too expensive.
Only for the skin nonabsorbable sutures were used; all the intravaginal suturing was done with chromic catgut ## 00, 0, 1 or 2.

All the operations were performed with the patient lying on her back, legs up and abducted in stirrups, and buttocks raised to obtain a good view of the operation field.
All the VVF-repairs were performed via the vagina, except for two, viz. a vesicouterocervical fistula and a transsymphyseal fistula.
With time more and more uni- or bilateral episiotomies at 4 and 8 o'clock were performed to obtain a better accessibility; often a median episiotomy was done when a lateral episiotomy was not felt necessary.
Right from the beginning the flap-splitting technic has been used dissecting the anterior vaginal wall widely from the bladder following a circumferential incision at the fistula edge with bilateral transverse extensions; never was any tissue excised. A FOLEY catheter, preferably size Ch 16, was then inserted into the bladder, and the balloon inflated. Almost always the bladder was closed transversely, as it presented itself that way as the easiest; longitudinal closure seemed to be against the directions of tension.
Special care was taken to repair the bladder completely tensionless, but this was not always possible; in the beginning with a double layer of chromic catgut, but from operation No. 91 onwards in principle only with a single layer of interrupted chromic catgut. The bladder was closed with inverting sutures to prevent cross-union between the bladder mucosa and the anterior vaginal wall mucosa, and good bites were taken to obtain broad contact of the raw bladder musculature for strong healing. The bladder was closed always working bilaterally from the angles towards the midline. Closure was checked by the instillation of gentian violet into the bladder: 20 ml when a bulbocavernosus fat/muscle graft (MARTIUS, 1928) was planned and used and 50 ml when this was not done. If possible a bulbocavernosus fat/muscle graft was used, mostly from the right side, in the beginning for all types of fistulae, later on only for fistulae involving the closing mechanism. At first it was used only to cover the repair, but later also with the intention to elevate the bladder neck by suturing it bilaterally onto the inferior pubic bones/pubococcygeus muscles. The anterior vaginal wall was closed, also almost always transversely, with a single layer of interrupted chromic catgut. This layer was made everting to prevent also cross-union between the anterior vaginal wall mucosa and the bladder mucosa. When a bulbocavernosus fat/muscle graft had been used, the skin of the labium was closed with interrupted supramid #0 sutures and a pressure pad fixed to prevent bleeding and so hematoma of the fat/muscle bed. When an episiotomy or episiotomies had been performed, only the skin was closed with interrupted supramid #0 sutures. Intravaginally the episiotomies were not closed so as to take off any tension on the anterior vaginal wall repair. The vagina was packed seemly tight with gauze soaked in an antiseptic, savlon or acriflavine, to prevent bleeding and hematoma with eventual breaking down of the repair.
This has been the principal plan of action. However, as the fistulae varied in size, location, texture and accessibility, the operation technic was modified individually according to whatever was necessary and whatever was possible as follows:

<u>specific remarks</u>

Vesicocervicovaginal and/or vesicouterovaginal fistula, most of the time following a cesarean section or subtotal hysterectomy because of a ruptured uterus. If the ureter(s) could be identified they were catheterized for 20-25 cm; then a circumferential incision at the fistula edge and dissection of the bladder from the cervix/uterus were performed; a bulbocavernosus fat/muscle grafting was not done.

Vesicovaginal fistula at bladder base not involving the closing mechanism. The ureters were catheterized if identified (Fig. 18); then the fistula edge was incised circumferentially, the anterior vaginal wall dissected from the bladder and if necessary the bladder mobilized from the cervix; a bulbocavernosus fat/muscle graft was not used.

Vesicovaginal fistula at bladder neck involving the closing mechanism, most of the time including the proximal urethra as well and then called **urethrovesicovaginal fistula**. A circumferential incision was performed at the fistula edge and the anterior vaginal wall was dissected from the bladder and urethra; if possible a bulbocavernosus fat/muscle graft was done.

Urethrovaginal fistula with (sub)total loss of urethra, with or without a vesicovaginal fistula. First, a U incision was made around the bladder opening and bilaterally from the urethra roof, if still present; with bilateral transverse extensions at the base. Then the urethral/vaginal mucosa or scar tissue of the U incision was dissected bilaterally free leaving it fixed to the symphysis in the midline. The anterior vaginal wall was dissected from the lateral sides and the bladder, and a FOLEY catheter Ch 16, or if not available another size, was inserted. The urethra was reconstructed longitudinally over the catheter with interrupted inverting chromic catgut using the mobilized tissue. The paraurethral muscles were incised bilaterally and longitudinally up to the symphysis and sutured over the urethra repair to provide this neourethra with a muscular coat. The bulbocavernosus fat/muscle graft was sutured longitudinally over the whole repair and the anterior vaginal wall was closed in the form of a mercedes benz star or an inverted Y. When the fistula was large, the bladder was fixed bilaterally onto the symphysis/pubic bones periost with anchoring sutures starting always at the angles to obtain complete closure of the bladder.

When the **fistula** was **fixed to the symphysis/pubic bones**, the anterior vaginal wall was dissected from them, and the bladder only so much that a completely tensionless closure could be performed.

In very **extensive fistulae** where there was not very much left of the bladder floor, the bladder was dissected from the cervix as far as possible even up to the extent of opening the abdominal cavity for mobilization of bladder and bladder peritoneum sothat the bladder could be closed.

Exceptionally, the defect of the bladder floor and urethra was so extensive that a **two-stage operation** was performed. At the first stage the bladder was anchored onto the symphysis periost and at the second stage the urethra was reconstructed. The first time this had to be done the urethra was reconstructed first, but it was a complete failure.

The **transsymphyseal fistula** was closed by excision of the fistula tract and closure of as much tissue over the symphysis as possible; the patient was nursed postoperatively in a sling as used for symphysiolysis.

At first, **large defects of the anterior vaginal wall** were closed directly leading to a shortening of the vagina. Later on a skin-mucosa flap was used from the labia majus and minus of the same side as the bulbocavernosus fat/muscle graft (the HAMLINs, personal communication).

When there was a **stricture or stenosis of the vagina** these were cleaved longitudinally together with the episiotomies, either uni- or bilaterally or medially, and then they were left open.

Multiple fistulae, if near to each other, were made into one and then repaired according to the normal principles; otherwise they were repaired separately.

When there was a **combination VVF/RVF**, in the beginning first the RVF was repaired and then 3 months later the VVF. However, better results were obtained later when first the VVF was operated and then the RVF. Also the patients prefered it that way, as a RVF does not trouble them as much as a VVF.

The 500 first operations in these patients have been listed in Table XIV.

Table XIV
type of first operation

type of operation	number	%
VVF-repair + graft	343	68.6
VVF-repair only	98	19.6
urethra reconstruction + graft	56	11.2
iatrogenic RVF-repair	1	0.2
extirpation of tract	1	0.2
abdominal repair	1	0.2
total	500	100.0

To come to a better evaluation of the results according to the location of the fistula and type of operation used, the patients were divided into 3 groups:

I. 156 patients with fistulae not involving the closing mechanism as listed in Table XV.

IIa. 288 patients with fistulae involving the closing mechanism without urethra loss as listed in Table XVI.

IIb. 56 patients with fistulae involving the closing mechanism with (sub)total loss of urethra as listed in Table XVII.

Table XV
fistulae not involving the closing mechanism

type of operation	number	%
VVF-repair only	90	57.7
VVF-repair + graft	65	41.7
abdominal repair	1	0.6
total	156	100.0

Table XVI
fistulae involving the closing mechanism without urethra loss

type of operation	number	%
(U)VVF-repair + graft	278	96.6
(U)VVF-repair only	8	2.8
iatrogenic RVF-repair	1	0.3
extirpation of tract	1	0.3
total	288	100.0

Table XVII
fistulae involving the closing mechanism with (sub)total urethra loss

type of operation	number	%
urethra reconstruction + U(V)VF repair + graft	56	100.0

When the repair was not succesful, the patients had to wait a minimum period of 3 months before re-operation was undertaken.

When the fistula had been closed, but urinary (stress) incontinence developed, several operation technics were tried to plicate and elevate the bladder neck/UV-junction/proximal urethra; as listed in Table XIX.

When the patients developed such severe vagina shortening and stenosis that sexual intercourse was not possible (Fig. 19), a widening-lengthening vaginoplasty was performed, but only if the patient insisted upon it. The posterior vaginal wall was reconstructed either with a unilateral skin rotation flap from the buttocks or with bilateral skin rotation flaps from the inner side of the upper legs.

In total 620 operations were performed in these 500 patients or 1.2 operations per patient. The operations could be divided into three groups according to the purpose:

A. operations for closing the fistula, in total 561, as listed in Table XVIII.
B. operations for urinary (stress) incontinence, in total 53, as shown in Table XIX; five different operation technics were used.
C. miscellaneous, in total 6, as given in Table XX.

Table XVIII
operations for closing the fistula

type of operation	number
VVF-repair + graft	351
VVF-repair only	139
urethra reconstruction + graft	62
urethra reconstruction	6
abdominal repair	1
extirpation of transsymphyseal fistula tract	1
iatrogenic RVF-repair	1
total	561

Table XIX
operations for urinary (stress) incontinence

type of operation	number
rhaphy/elevation of bladder neck onto pubic bones	22
elevation of bladder neck onto pubic bones	6
pubococcygeus elevation of bladder neck	9
puboccygeus elevation + widening vaginoplasty	3
lengthening urethroplasty	5
lengthening urethroplasty + graft	3
suprapubic suspension of bladder neck	4
rhaphy/elevation by graft	1
total	53

Table XX
miscellaneous operations

type of operation	number
lengthening/widening vaginoplasty	3
vaginal removal of impacted stone	1
cystostomy + bladder stone removal	1
anterior vaginal wall reconstruction	1
total	6

The operation duration varied from 15 min for an easy VVF-repair up to 4 hr for a difficult one, with a mean time of 60-75 min. No patient was operated more than 4 times.

When the 170 previous operations are included, a total of 790 operations were performed or 1.6 operations per patient.

postoperative care

Only when the patient was in a good condition and when there was a good urine flow, she was transfered from the operation theater to the female leprosy ward.
Only when the blood pressure was below 80 mm Hg with insufficient urine flow immediately postoperatively or when severe diarrhea developed in the postoperative period, intravenous fluids were given; see also Chapter V, anesthesia.
Postoperative analgesic treatment was done by one intramuscular injection of morphine, 10 or 15 mg, or of pethidine, 50 or 100 mg; depending upon whatever was available.
The patient was instructed to drink as much as possible as to produce a minimum of 4000 ml of urine in 24 hr in order 1) to prevent ascending urinary tract infection and 2) to keep the catheter open. The staff as well as the person(s) looking after her were also instructed to make sure the patient drank enough.
Whenever the catheter was blocked, the staff had been instructed to flush it with normal "clean" water. However, the patients were late in reporting and the staff late in reacting. If the catheter could not be deblocked, another catheter was inserted.
On the operation day itself no food was given to the patient, eating commencing the day following operation.
All the patients with intraoperative blood loss of 250 ml or more were supposed to get intramuscular iron-dextran or at least oral fersolate, but most of the time this was not available in the hospital and they had to buy it in town.
No routine antibiotic or uroseptic prophylaxis was given. Only on real indication, such as fecal contamination of the abdominal cavity, pneumonia, (uro)sepsis etc., the patient was given procaine penicillin, preferably in combination with streptomycin, for 5-7 days. In total, it was given only 14 times (2.3%) after all these 620 operations. For wound infection antibotics were never given.
When fever developed chloroquine was given first, also when antibiotics were indicated as well; this is the routine in any endemic malaria region.
The pressure pad and vaginal pack were removed the day after operation, and the wound(s) were treated further without any covering in the open air. The sutures were removed 7 days following operation.
In the beginning after 2 weeks and, for operational purposes, later after 3 weeks the patient was seen in the operation theater. Then the wound(s) were inspected and if she was not leaking the catheter removed; if she was still leaking the catheter was left in for a further 3-6 week.
The patient was instructed to pass urine immediately, and to return the following morning in order to report as to leaking, (in)continence and micturition.
The patient also was instructed to refrain from sexual intercourse for 6 months following operation.

The patient could go home or stay in the "hostel" for 2 weeks when the first vaginal examination was done. Further check-ups were done after 1 month and then after every 2 months up to 6 months postoperatively.
Each patient was given a card with date and type of operation and written instructions that further pregnancies should be ended by cesarean section. They were instructed to report again if they became pregnant. When they came back pregnant, they were examined and instructed to attend an antenatal clinic and to deliver in a hospital; and to show the child afterwards.

DISCUSSION

Except for a clinical examination, no other standard preoperative investigations were performed, as no facilities were available. Some of the investigations, as propagated by others (LAGUNDOYE, 1976; LAWSON, 1967; ZACHARIN, 1988), such as cystoscopy, intravenous pyelography and examination in anesthesia, as a routine are superfluous and are not without risk; also they are far too expensive in developing countries.

That all the operations were performed in normal daylight without additional operation light was not a problem at all; not even in identifying and catheterizing the ureter(s): 54x during the first operation, 34x bilaterally, 7x at the right side and 13x at the left side.

The exaggerated lithotomy position with the legs raised and abducted in stirrups seems to be the position of choice, and it was used without exception in all the operations. Its advantages are: it is easy, no special equipment is required, spinal anesthesia can be given with normal respiration of the patient, no pooling of blood in the legs occurs, and it gives an excellent view of the operation field. All the other positions, such as knee-elbow and left- or right-sided, need special fixation of the patient on the operation table, general anesthesia with intatracheal intubation and interference with respiration, and more personnel, and is more traumatizing to the patient.
Performing suprapubic partial transvesical prostatectomies and VVF-repairs under similar conditions and having a good experience in both, I must say that the vagina is the route of choice in VVF-surgery; only exceptionally other approaches are justified. The only abdominal approach during the 5-year period was for a vesicouterocervical fistula and the second repair in my life. Later on this type of fistula was operated vaginally dissecting the bladder from the cervix/uterus, closing the bladder and leaving the cervix/uterus unattended. Therefore I agree strongly with CHASSAR MOIR in asking his famous rhetoric question about how to perform a tonsillectomy "through the mouth or through the neck?".
Right from the beginning the flap-splitting technic was used as the principal plan of action. The wide dissection of the anterior vaginal wall from the bladder makes mobilization of the bladder and thus closure easier. Besides this, it is also easier to close the defect of the anterior vaginal wall. Theoretically, there is more chance of further trauma to the bladder and anterior vaginal wall, and it might interfere with the

blood supply of the latter. Practically, even following very extensive dissection of the anterior vaginal wall, necrosis was not seen. In my opinon, the advantages outweigh by far the disadvantages. The further trauma to the bladder and anterior vaginal wall as well as the exceptional necrosis of the anterior vaginal wall should be taken as a safe risk.

However, as there is a variety of fistulae in different locations, the operation technic has to vary accordingly. It does not seem wise to stick to one thing only, as other technics have certain advantages needed in specific situations, especially if the surgeon is familiar with them. The principal aim is: to close the fistula and to make the patient continent.

The SIMS technic as modified by CHASSAR MOIR seems to be very useful in certain situations, especially in patients who have been operated many times with a lot of scar tissue. Following minimal dissection, the bladder is closed with a running suture and the emphasis is being placed on meticulous closure of the anterior vaginal wall.

With the FUETH technic a 0.5-cm broad circumferential strip of the anterior vaginal wall is left attached to the bladder. This is mobilized centripetally but still left in contact with the bladder. The fistula is closed with sutures through the raw bladder musculature, and the vaginal wall inside the bladder is supposed to work as a collar or cork. I do not see how the collar or cork works, neither theoretically nor practically. The anterior vaginal wall forms a funnel lined by mucosa within the bladder which is not optimal for good healing and which might exert tension on the suture line in the bladder musculature. Also one will get vaginal mucosa within the bladder, and in the large fistulae a shortening of the anterior vaginal wall of at least 1 cm; in small fistulae inverting the bladder will become difficult.

It has not been necessary to use the LATZKO technic in vaginal vault fistula, as the flap-splitting technic gave good results in this type of fistula.

Very extensive operation technics, e.g. as described by TURNER-WARWICK (1986), are not suited for developing countries.

Any technic whereby a part of the anterior vaginal wall is being resected to avoid overlapping suture lines, such as proposed by LEACH and RAZ (1983), may be of use in surgical fistulae with a normal vagina, but certainly not in necrotic fistulae where all the material should be saved.

I agree with the HAMLINs (personal communication) in stating that excision of scar tissue of the bladder will only result in a bigger defect which has to be closed.

I agree with MAHFOUZ (1957) and HASPELS (personal communication) in advocating a one-layer closure of the bladder to obtain a good result. More layers make the repair more complicated and need more bladder tissue.

Having overcome my false pride, more and more episitomies were performed to obtain a better accessibility.

In all the operations a FOLEY catheter was used, as no other type was available. The size of choice seems to be Ch 16, though one cannot be too critical in developing countries. The balloon might press upon the repair and, if the catheter gets blocked, may obstruct the outflow of urine along the catheter. A silastic whistle tip catheter is less irritating, does not press upon the repair and does not obstruct the outflow of urine when blocked; but it was not available. A size Ch 12 catheter as advocated by SYMMONDS (1978) for urethra reconstruction is too small, as there seems to be a scarring tendency resulting in urethra stricture at the UV-junction. However, we work under totally different conditions with a completely different type of patients and fistulae.

Theoretically, I agree with longitudinal closure of the bladder from east to west in bladder neck fistulae, but practically this seems to be against the lines of tension.

Therefore more than 95% of all the fistulae have been closed transversely from north to south, as this was the most logical way to proceed.
Depending upon anatomic location, function and surgical technic, the fistulae were divided into the following groups: I. fistulae not involving the closing mechanism and II. fistulae involving the closing mechanism, a) without urethra loss and b) with urethra loss.
If technically possible, the bulbocavernosus fat/muscle graft should be used in any fistula involving the closing mechanism. Theoretically, it covers the bladder repair, brings an additional blood supply to the operation area, prevents the contact between bladder mucosa and anterior vaginal wall mucosa, fills up the dead space, and might prevent recurrence at following deliveries. Because of technical difficulties it is not suited for routine use in fistulae not involving the closing mechanism.

Routine antibiotic and uroseptic "prophylaxis" seems to be not necessary, just like in other types of surgery. In this series, antibiotics were given only 14 times (2.3%) after all these 620 operations.
It is far more important to make sure that the urine production is so abundant that 1) ascending urinary tract infection is prevented and 2) the catheter is kept open. Therefore the patients should be urged to drink as much as possible in order to produce at least 4000 ml of urine per 24 hr. On the operation day itself not too much should be drunk, as there was a self-limiting syndrome of overhydration in 5 young girls on the first postoperative day.

Though 12-14 days are probably enough, the cathether was left in for 3 weeks, and if still leaking longer. This was done not only for operational purposes, but also sothat minor defects had time to heal. Adverse effects were not seen, and I was encouraged in this thinking by the results in another group of patients in whom "spontaneous" healing was promoted by catheter treatment for 4-6 weeks, see Chapter VI.

Chapter IIc
results in the first 500 consecutive VVF-patients

The ideal objective of any VVF-repair is (1) to close the fistula, (2) to restore continence, (3) to restore normal micturition, (4) to make a functional vagina for sexual intercourse and (5) to keep intact the progeneration, all in order to resocialize the patient. However, this cannot be achieved in every patient.
In developing countries not all these parameters can be evaluated systematically. Therefore only (1) closure, (2) continence and (3) micturition were documented in a systematic way.
Only those patients who were complaining of urinary (stress) incontinence and wanted an operation were considered to be closed and incontinent. Patients with minor forms of incontinence which did not bother them or their environment were considered to be closed and continent.
All the patients, except for 2 who absconded, have been examined at least once vaginally 5 weeks postoperatively, and more than 90% completed the full check-up period of 6 months.

operative results

The results at first attempt for the whole group are listed in Table XXI; for group I in Table XXII; for group IIa in Table XXIII; and for group IIb in Table XXIV.

Table XXI
results of first operation in all patients

result			number	%
fistula closed			439	87.8
continent	391	78.2%		
incontinent	48	9.6%		
fistula not closed			45	9.0
dead			12	2.4
absconded before examination			2	0.4
questionable			2	0.4
		total	500	100.0

Table XXII
results of first operation in the 156 fistulae not involving the closing mechanism

result			number	%
fistula closed			141	90.4
continent	139	89.1%		
incontinent	2	1.3%		
fistula not closed			10	6.4
dead			5	3.2
		total	156	100.0

Table XXIII
results of first operation in the 288 fistulae involving the closing mechanism without urethra loss

result			number	%
fistula closed			255	88.5
continent	218	75.7%		
incontinent	37	12.8%		
fistula not closed			23	8.0
dead			6	2.1
absconded before examination			2	0.7
questionable			2	0.7
		total	288	100.0

Table XXIV
results of first operation in the 56 fistulae involving the closing mechanism with urethra loss

result			number	%
fistula closed			43	76.8
continent	34	60.7%		
incontinent	9	16.1%		
fistula not closed			12	21.4
dead			1	1.8
		total	56	100.0

The primary closure rate was 439 (87.8%) after the first operation in this series of 500 patients:

I. 141 (90.4%) of the 156 patients with a fistula not involving the closing mechanism;
IIa. 255 (88.5%) of the 288 patients with a fistula involving the closing mechanism without urethra loss; and
IIb. 43 (76.8%) of the 56 patients with a fistula involving the closing mechanism with urethra loss.

The primary incontinence rate at first attempt was 48 (10.9%) out of the 439 closed fistulae:

I. 2 (1.4%) of the 141 closed fistulae not involving the closing mechanism;
IIa. 37 (14.5%) of the 255 closed fistulae involving the closing mechanism without urethra loss; and
IIb. 9 (20.9%) of the 43 closed fistulae involving the closing mechanism with urethra loss.

The result was questionable in two patients in whom previously an implantation of the ureters into the bowel had been performed; one presented with an extensive UVVF in a totally contracted vagina and stated she was leaking urine, and the other had an extensive UVVF with a large RVF. In both it was possible to close the UVVF; in the first also a widening vaginoplasty was performed with good result; in the second the RVF was closed after 3 RVF-repairs. Both complained that they were leaking urine through the anus at night.

The final results of all the 620 operations are given in Table XXV; for group I in Table XXVI; for group IIa in Table XXVII; and for group IIb in Table XXVIII.

Table XXV
final results of all 620 operations

result			number	%
fistula closed			465	93.0
continent	424	84.8%		
incontinent	41	8.2%		
fistula not closed			17	3.4
dead			14	2.8
absconded			2	0.4
questionable			2	0.4
		total	500	100.0

Table XVI
final results in the 156 fistulae not involving the closing mechanism

result			number	%
fistula closed			148	94.9
continent	146	93.6%		
incontinent	2	1.3%		
fistula not closed			3	1.9
dead			5	3.2
		total	156	100.0

Table XXVII
final results in the 288 fistulae involving the closing mechanism without urethra loss

result			number	%
fistula closed			268	93.1
continent	236	81.9%		
incontinent	32	11.1%		
fistula not closed			9	3.1
dead			7	2.4
absconded			2	0.7
questionable			2	0.7
		total	288	100.0

Table XXVIII
final result in the 56 fistulae involving the closing mechanism with urethra loss

result			number	%
fistula closed			49	87.5
continent	42	75.0%		
incontinent	7	12.5%		
fistula not closed			5	8.9
dead			2	3.6
		total	56	100.0

The final closure rate was 465 (93.0%) in this series of 500 patients following a total of 620 operations:

I. 148 (94.9%) of the 156 patients with a fistula not involving the closing mechanism;
IIa. 268 (93.1%) of the 288 patients with a fistula involving the closing mechanism without urethra loss; and
IIb. 49 (87.5%) of the 56 patients with a fistula involving the closing mechanism with urethra loss.

The final incontinence rate was 41 (8.8%) of the 465 closed fistulae in this series of 500 patients:

I. 2 (1.4%) of the 148 closed fistulae not involving the closing mechanism;
IIa. 32 (11.9%) of the 268 closed fistulae involving the closing mechanism without urethra loss; and
IIb. 7 (14.3%) of the 49 closed fistulae involving the closing mechanism with urethra loss.

intraoperative complications

There were no intraoperative deaths; also no patient had to be rushed out of the theater to die in the wards.
The major complication during operation was fecal contamination of the operation field when the patient was passing loose stools despite proper instructions; this happened frequently.
Further trauma to the bladder and/or anterior vaginal wall was sometimes encountered; this was repaired at the same operation session.
Once in a while the needle broke at the pubic bone. Most of the time it was retrieved completely, but in 3 patients it could not be found and a piece of the needle was left in.
Ligation of the ureter(s) has not been noted, neither during the operation nor in the postoperative period.
The ureter was cut through in 2 patients; this was repaired in the same operation session; unfortunately, one patient, Pt 387-VVF 430, died on the 5th postoperative day from pneumonia.
A rectovaginal fistula was made in 2 patients when performing the episiotomy in a stenosed vagina; this was repaired in the same operation session. In one patient, viz. Pt 180-VVF202, only the iatrogenic RVF could be repaired; unfortunately, this patient died on the first postoperative day from endotoxin shock.
During the only abdominal repair the uterine body tore out from the cervix at the defect due to traction, and a supravaginal hysterectomy had to be performed.
In one patient, Pt 31-VVF 31/50/89/563, the bladder might have been perforated when dilating the urethra at the 4th operation leading to urosepsis; she died 5 days following operation.
An estimated blood loss of 250 ml or more was noted in 60 (9.7%) of all these 620 operation. It was never so much, the largest amount estimated at $\pm$ 400 ml, that an emergency blood transfusion was necessary.

postoperative complications

The most serious postoperative complication was death which occurred in 14 patients, from 1 day up to 19 days following operation. This stands for a postoperative mortality rate of 2.8% per patient and 2.3% per operation.
The cause of death, age of patient and interval between operation and death are listed in Table XXIX.

Table XXIX
postoperative mortality

patient-operation	age	cause of death	interval
Pt 31 -VVF 31/50/89/563	31 yr	(uro)sepsis	5 days
Pt 35 -VVF 35	35 yr	starvation	16 days
Pt 47 -VVF 49	17 yr	thromboembolism	2 days
Pt 138-VVF 156/161/269	23 yr	diarrhea	16 days
Pt 151-VVF 170	18 yr	(uro)sepsis	9 days
Pt 180-VVF 202	18 yr	endotoxin shock	1 day
Pt 181-VVF 203	24 yr	diarrhea	19 days
Pt 205-VVF 227	20 yr	diarrhea	10 days
Pt 341-VVF 375	18 yr	diarrhea	11 days
Pt 354-VVF 389	18 yr	thromboembolism	4 days
Pt 383-VVF 425	25 yr	(uro)sepsis	13 days
Pt 387-VVF 430	25 yr	pneumonia	5 days
Pt 391-VVF 435	24 yr	thromboembolism	12 days
Pt 495-VVF 551	21 yr	thromboembolism	3 days

The cause of death was determined clinically as following: pulmonary thromboembolism in 4 patients, diarrhea in 4 patients, (uro)sepsis in 3 patients, endotoxin shock in 1 patient, pneumonia in 1 patient and starvation in 1 patient.
In one patient the urosepsis might have been due to perforation of the bladder at the 4th operation. The endotoxin shock was due to heavy stool contamination of the abdominal cavity at the iatrogenic RVF-repair. One patient developed pneumonia following abdominal distension, and one patient refused all types of food and fluids after she started to leak again following operation.
Among the first 60 operations there was a strange syndrome in five young girls, 15-17 years old, who became unconscious and developed epileptic seizures the day following operation, without any sign of meningitis. This was treated with pethidine i.m. only and resolved completely within 10-15 hours. As this was thought to be cerebral excitation due to overhydration with hyponatremia, the fluid intake on the operation day itself was restricted. Since then it has been seen only one more time, in a 16-year-old girl.

There were 3 postoperative bleedings 12-14 days following operation needing blood transfusion. It happened twice in one patient following each time she was operated. One day following the last blood transfusion she developed severe diarrhea and died.

Hematoma of the bulbocavernosus fat/muscle bed occurred not infrequently, but it has not been documented systematically; the wound was opened, the hematoma expressed and an acriflavine dressing applied.

Wound infection occurred rarely, and in the beginning was not documented. Later on, at the same time that the catheter was removed it was documented as well whether the skin wound had healed or not. Of all the episiotomies done, not a single one became infected or dehiscent.

In one patient the catheter had to be removed on the 10th postoperative day because of severe cystitis which did not respond to septrin.

Very few patients complained of urine retention following removal of the catheter and had to be catheterized once or twice.

late complications

One patient reported back to the hospital 2.5 months postoperatively with incontinence; though in good condition when she was examined, she died overnight in the "hostel".
In 2 patients in whom an incontinence operation was performed a new fistula developed; they have not yet been operated again.
Recurrence of the fistula, 6 to 12 months postoperatively, was noted in four patients following a period of high fever: in 3 patients at the original site or within the scar tissue, and in 1 patient at a completely different site. This last patient developed a vesicocervical fistula from which she was leaking urine, but not when menstruating. At a second operation these fistulae could be closed, and the patients were continent.
Another patient came back with overflow incontinence following a road traffic accident 10 months postoperatively. She was healed by an indwelling bladder catheter for 4 weeks. Then 2.5 months later she reported again with an abscess of the donor site of the graft with leaking. She was healed completely by incision of the abscess and an indwelling bladder catheter for 6 weeks.
The patient in whom the transsymphyseal tract had been excised came back 3x with an abscess of the operation site, in the 3 years since operation. The abscess was incised and an indwelling bladder catheter given for 4 weeks after which she recovered.
Bladder stone formation was seen in three patients. One patient still had a fistula, and a vaginal removal of the impacted stone was performed; later on a VVF-repair was done without success. In one patient cystostomy and stone removal was performed, and she was cured completely. One patient came back after 4 years with a 7x5x5 cm bladder stone, a new fistula and very poor general condition due to urosepsis. A cystostomy with removal of the stone was performed and antibiotics given. The general condition improved remarkably sothat a VVF-repair could be done after which she healed completely.
A stricture of the UV-junction following urethra reconstruction was encountered in 4 patients: in 3 with continence and in 1 with incontinence.
In few of the other patients a stricture of the UV-junction also developed which could be treated successfully in most cases only by dilatation. It might have led to stone formation in 1 of the 3 patients with a bladder stone.

One patient became incontinent 13 months postoperatively following a period of high fever with abdominal pain; she presented with overflow incontinence due to a stricture at the UV-junction. After the first repair of a 5-cm fistula at right bladder neck, she had lost the distal 2 cm of the urethra, but she was completely continent. Following widening plasty of the UV-junction, urethra reconstruction and anterior vaginal wall reconstruction she was healed.
Five patients reported back with a new fistula following obstructed labor: 3 delivered vaginally at home; and 2 delivered in a hospital, one by cesarean section and one vaginally.
One patient reported back after 3 years with a new fistula, but she refused to tell what had happened. This patient had been operated 4x before she was healed. Another VVF-repair with anterior vaginal wall reconstruction was performed after which she healed completely.
All the episiotomies healed off nicely; but it has not been enquired if there was dyspareunia.
The longitudinal incision of the labium majus not always gave a good cosmetic result; one patient developed keloid of the scar.

social results

Once the fistula had been closed and the patient was continent, almost all of them married again or went back to their original husband. Even severe shortening and/or stenosis of the vagina does not seem to be a problem, as several of them came back later pregnant. Only 3 patients insisted upon a total reconstruction of the vagina.
A total of 108 patients reported back to the hospital when they were pregnant again. Following examination and confirmation of the pregnancy, they were instructed to attend an antenatal clinic and to go in time to a hospital for delivery.
Out of the 25 patients who reported back after delivery, 14 delivered vaginally at home, 2 aborted at home, 7 delivered in a hospital by cesarean section and 2 delivered vaginally in a hospital.
Out of the 23 infants born, 19 were alive and 4 died perinatally.

DISCUSSION

Before we come to a discussion of the results we have to consider the primitive circumstances and the lack of facilities, instruments and materials, but especially the postoperative care which is far from optimal. However, if we want to do something for the patients in the developing world we have to accept these things.
It must also be considered that these patients cannot be traced and contacted at home. Therefore only the last examination was taken into account in evaluating the results.
No differentiation could be made between neurogenic and stress incontinence, as no urodynamic investigation could be done.

The results clearly show the regressive outcome as to closure and to continence from I. fistulae not involving the closing mechanism to IIa. fistulae involving the closing mechanism without urethra loss to IIb. fistulae involving the closing mechanism with urethra loss.

The results also show that postoperative urinary (stress) incontinence is the major problem in VVF-surgery of fistulae involving the closing mechanism, group IIa and IIb.

Even a total of 53 incontinence operations with 5 different technics could not greatly improve the results. This is not surprising as in these patients the closing mechanism of the bladder had been damaged or totally lost.

When postoperative urinary (stress) incontinence develops we have to work according to the following principles: 1) rhaphy of the bladder neck and proximal urethra, 2) elevation of the bladder neck and proximal urethra and 3) lengthening/ stretching of the urethra.
No definite solution was found in this series of patients.

Also other studies report about stress incontinence following VVF-repair (NAIDU, 1962; GRAY 1970; HASSIM & LUCAS, 1974).

I agree with LAWSON (1967) in stating that the size of the bladder is not interfering with normal bladder functioning following operation. One patient where the balloon could not be filled with more than 1 ml at operation was completely continent immediately when the catheter was removed following a successful repair.

The postoperative mortality rate of 2.8% per patient and 2.3% per operation is low for developing countries, considering the facilities and circumstances and the condition of the patient. It can only be reduced by better pre- and postoperative care.
BAKOWSKI (1957), in a series of 293 patients seen between 1941 and 1955 in a university hospital in Berlin, found a postoperative mortality rate of 6.9% per patient and 3.3% per operation in the 144 (U)VVF-patients as operated by 300 procedures, because 10 patients died as a direct result of operation.

The fatal pulmonary thromboembolism rate of 0.7% per operation is low; but only 2 patients were older than 40 years.
Death due to diarrhea is preventable and unacceptable in a postoperative ward; but diarrhea itself is a major cause of death in developing countries.
The fatal (uro)sepsis in 3 patients might have been partly due to pre-existing renal disease.
Since the fatal endotoxin shock in 1 patient, whenever there was fecal contamination of the abdominal cavity the patient was given antibiotics whilst on the operation table; since then it has not been seen anymore.
The patient with fatal pneumonia had abdominal distension for 3 days and then developed pneumonia.
I have no explanation for the starvation in 1 patient other than that this happens once in a while; it was not due to meningitis.

Postoperative wound infection does not seem to play a role of importance, as a) the area is having a very good blood supply and b) due to every-day stool contamination the area is more or less immune to infection. As wound infection was not documented systematically from the beginning in this series, figures cannot be presented here but will be given in Chapter III.

Infection played a part in the 4 patients who were completely normal until a bout of fever. Interestingly the patient who developed a vesicocervical fistula was not leaking when menstruating.

Following a successful repair most of the patients delivered at home despite strict instructions. This is due to lack of health facilities in their neighborhood and lack of transport to bring them to a functioning health center. Health education will function only if the facilities are being provided as well. Therefore it will take a long time until the obstetric fistula will have disappeared in Africa.

Chapter III
operation technic and results in 150 VVF-patients with fistulae involving the closing mechanism without urethra loss

introduction

A. As postoperative urinary (stress) incontinence is the biggest problem in patients with fistulae involving the closing mechanism, it was thought that elevation of the bladder neck/UV-junction/proximal urethra at the first attempt might contribute to a better outcome in this respect.
The bulbocavernosus fat/muscle graft cannot elevate the bladder neck sufficiently when it is fixed to the inferior pubic bones.
Therefore a different fixation of the bulbocavernosus fat/muscle graft was devised, viz. bilaterally as far anterosuperiorly as possible onto the periost at the back of the superior pubic bones and onto the pubococcygeus muscles. This technic was tried out in the patients 501-700 where several operation-technical problems were solved.
In January 1988, a prospective study was started with patient 701 to find out how effective this fixation is.

B. Many times the anterior vaginal wall is (sub)totally lost and has to be reconstructed as well to cover the repair and the graft without too much shortening of the vagina.
Therefore a technic was devised to reconstruct the anterior vaginal wall with bilateral skin-mucosa advancement flaps from both labia to prevent shortening and stenosis of the vagina.
This technic was tried out at the same time in the patients with large defects of the anterior vaginal wall.

materials

A+B. The first 150 consecutive patients in 1988 who were operated by technic A, and if indicated by technic B as well, have been selected.
As is was felt that a circumferential defect at the bladder neck/UV-junction/proximal urethra (Fig. 20) might influence the outcome, this was specifically looked for.
The relevant patient data are given in Table XXX.

Table XXX

patient-operation	age	P	fist size	circum defect	EUOF dist	blad pro	prev op
Pt 702-VVF 804	16 yr	I	3 cm		4 cm		
Pt 703-VVF 805	13 yr	I	2 cm		4 cm		
Pt 704-VVF 806	17 yr	X	3 cm		3 cm		1x
Pt 705-VVF 807	45 yr	X	4 cm		3 cm	+	
Pt 706-VVF 808	22 yr	VI	3 cm	+	5 cm		
Pt 713-VVF 816	21 yr	II	1.5 cm	+	3 cm		
Pt 714-VVF 817	26 yr	III	6 cm	+	1.5 cm	+	
Pt 715-VVF 819	14 yr	I	1.5 cm	+	1.5 cm		
Pt 716-VVF 820	14 yr	I	6 cm		2 cm		
Pt 717-VVF 822	15 yr	I	1 cm		1 cm		
Pt 718-VVF 823	15 yr	I	1.5 cm	+	4 cm		1x
Pt 719-VVF 825	16 yr	I	1.5 cm	+	5 cm		1x
Pt 722-VVF 828	16 yr	II	2 cm		4 cm		
Pt 723-VVF 829	25 yr	III	1 cm		3 cm		1x
Pt 724-VVF 830	26 yr	II	0.5 cm		1 cm		1x
Pt 725-VVF 831	17 yr	III	1.5 cm	+	1.5 cm		
Pt 726-VVF 832	25 yr	IV	6 cm	+	2.5 cm		1x
Pt 728-VVF 834	25 yr	I	0.5 cm		2.5 cm		
Pt 729-VVF 835	32 yr	VII	0.5 cm		3 cm		1x
Pt 730-VVF 836	17 yr	III	3 cm	+	1.5 cm		
Pt 731-VVF 837	22 yr	I	3 cm	+	1 cm		1x
Pt 732-VVF 838	15 yr	I	1.5 cm	+	3 cm		
Pt 733-VVF 839	21 yr	II	4 cm	+	4 cm		1x
Pt 734-VVF 840	52 yr	III	4 cm	+	2 cm	+	1x
Pt 735-VVF 841	20 yr	III	5 cm		4 cm	+	
Pt 737-VVF 843	28 yr	II	2 cm		3 cm		2x
Pt 738-VVF 844	29 yr	VIII	5 cm	+	5 cm	+	
Pt 739-VVF 845	18 yr	I	4 cm		5 cm	+	
Pt 740-VVF 846	29 yr	I	7 cm	+	1 cm		1x
Pt 741-VVF 847	19 yr	II	1.5 cm	+	3 cm		
Pt 742-VVF 848	25 yr	III	1 cm		1.5 cm		
Pt 743-VVF 849	19 yr	IV	4 cm		3 cm		
Pt 745-VVF 852	14 yr	I	3 cm	+	2 cm	+	
Pt 746-VVF 854	27 yr	VIII	1.5 cm	+	2.5 cm		
Pt 747-VVF 855	17 yr	I	4 cm		4 cm		
Pt 748-VVF 857	38 yr	III	0.5 cm		4 cm		
Pt 749-VVF 858	15 yr	I	2 cm	+	2.5 cm		
Pt 750-VVF 859	19 yr	VI	1 cm	+	3 cm		
Pt 751-VVF 860	18 yr	I	4 cm	+	4 cm		1x
Pt 752-VVF 861	37 yr	IX	2 cm		4 cm		1x

patient-operation	age	P	fist size	circum defect	EUOF dist	blad pro	prev op
Pt 755-VVF 864	21 yr	IV	3 cm		3 cm	+	1x
Pt 756-VVF 865	29 yr	XII	3 cm	+	3 cm		
Pt 757-VVF 866	24 yr	IV	2.5 cm		5 cm		??
Pt 758-VVF 867	14 yr	I	0.5 cm		5 cm		
Pt 759-VVF 868	14 yr	I	1.5 cm		2 cm		
Pt 760-VVF 869	17 yr	I	3 cm		1 cm		
Pt 761-VVF 870	24 yr	IV	1 cm		2 cm		
Pt 762-VVF 871	21 yr	I	4 cm	+	2 cm		1x
Pt 763-VVF 872	18 yr	III	1 cm		4 cm		
Pt 765-VVF 874	15 yr	I	2 cm	+	1.5 cm		
Pt 766-VVF 875	42 yr	X	3 cm		5 cm	+	
Pt 767-VVF 876	27 yr	III	4 cm	+	1.5 cm		
Pt 768-VVF 877	20 yr	I	1 cm		3 cm		1x
Pt 769-VVF 878	15 yr	I	5 cm	+	1.5 cm	+	
Pt 770-VVF 879	17 yr	I	6 cm	+	1.5 cm	+	
Pt 772-VVF 881	14 yr	I	3 cm	+	1 cm		
Pt 774-VVF 884	42 yr	VII	3 cm	+	3 cm		
Pt 777-VVF 887	24 yr	II	5 cm		3 cm	+	
Pt 779-VVF 889	15 yr	I	4 cm	+	3 cm		
Pt 782-VVF 893	15 yr	I	2.5 cm		3 cm		
Pt 783-VVF 894	14 yr	I	2.5 cm	+	2 cm		
Pt 784-VVF 895	19 yr	III	1 cm		4 cm		1x
Pt 785-VVF 896	15 yr	II	3 cm	+	3 cm		
Pt 786-VVF 897	14 yr	I/0	3 cm	+	2 cm		
Pt 790-VVF 903	61 yr	VII	5 cm	+	2 cm	+	
Pt 791-VVF 904	18 yr	I	5 cm	+	2 cm		1x
Pt 793-VVF 907	19 yr	III	1 cm	+	4 cm		1x
Pt 794-VVF 909	21 yr	III	0.1 cm		4 cm		
Pt 795-VVF 911	18 yr	III	2 cm	+	2 cm		1x
Pt 799-VVF 917	15 yr	I	2 cm	+	4 cm		
Pt 800-VVF 918	23 yr	I	3 cm	+	2 cm	+	??
Pt 804-VVF 922	33 yr	II	1 cm	+	4 cm		1x
Pt 805-VVF 924	18 yr	III	0.8 cm		4 cm		
Pt 807-VVF 927	31 yr	IX	4 cm		3 cm	+	
Pt 808-VVF 928	35 yr	X	0.1 cm		3 cm		1x
Pt 811-VVF 931	32 yr	III	0.5 cm		1 cm		1x
Pt 813-VVF 935	14 yr	I	1.5 cm		3 cm		
Pt 814-VVF 936	16 yr	I	3 cm	+	4 cm		
Pt 815-VVF 937	26 yr	I	0.4 cm		3 cm		1x
Pt 817-VVF 939	14 yr	I	3 cm	+	1 cm		

patient-operation	age	P	fist size	circum defect	EUOF dist	blad pro	prev op
Pt 818-VVF 940	29 yr	II	1 cm		3 cm		
Pt 820-VVF 942	26 yr	II	3 cm		2 cm		
Pt 821-VVF 943	21 yr	I	5 cm		5 cm	+	
Pt 822-VVF 944	14 yr	I	0.8 cm		4 cm		
Pt 823-VVF 945	14 yr	I/0	3 cm	+	2 cm		
Pt 824-VVF 946	14 yr	I	3 cm	+	3 cm		
Pt 827-VVF 949	24 yr	II	0.5 cm		4 cm		1x
Pt 828-VVF 950	27 yr	IV	1 cm		3 cm		1x
Pt 829-VVF 951	27 yr	I	1.5 cm		1 cm		
Pt 831-VVF 953	14 yr	I	1 cm		2 cm		
Pt 832-VVF 954	17 yr	II	4 cm	+	1.5 cm		
Pt 833-VVF 955	27 yr	I	6 cm	+	1 cm	+	
Pt 834-VVF 956	18 yr	I	0.2 cm		4 cm		1x
Pt 836-VVF 958	14 yr	I	2 cm		4 cm		
Pt 837-VVF 959	14 yr	I	1.5 cm		2 cm		
Pt 839-VVF 962	27 yr	IV	0.3 cm		4 cm		1x
Pt 844-VVF 967	23 yr	I	2 cm		2 cm		2x
Pt 845-VVF 968	16 yr	I	5 cm	+	2 cm		
Pt 848-VVF 971	16 yr	III	0.6 cm		2 cm		1x
Pt 853-VVF 979	18 yr	II	1 cm		4 cm		
Pt 858-VVF 986	19 yr	I	0.1 cm		2 cm		1x
Pt 861-VVF 992	20 yr	IV	3 cm		4 cm		
Pt 863-VVF 995	25 yr	II	6 cm		4 cm		
Pt 864-VVF 998	18 yr	I	3 cm	+	2 cm		
Pt 865-VVF 999	21 yr	III	4 cm	+	1.5 cm		
Pt 866-VVF 1000	18 yr	III	4 cm		4 cm		
Pt 867-VVF 1001	27 yr	VI	1 cm	+	4 cm		
Pt 868-VVF 1004	14 yr	I	2 cm	+	1.5 cm		
Pt 871-VVF 1007	15 yr	I	2.5 cm		5 cm		1x
Pt 872-VVF 1010	17 yr	II	2 cm	+	3 cm		
Pt 876-VVF 1016	26 yr	V	1 cm		4 cm		
Pt 877-VVF 1017	31 yr	I	0.3 cm		3 cm		4x
Pt 878-VVF 1018	22 yr	I	2 cm	+	2 cm		
Pt 880-VVF 1021	25 yr	I	0.5 cm		0.5 cm		4x
Pt 881-VVF 1022	14 yr	I	0.1 cm		4 cm		
Pt 882-VVF 1024	22 yr	V	2.5 cm	+	1 cm		2x
Pt 883-VVF 1025	17 yr	I	0.9 cm		4 cm		1x
Pt 885-VVF 1028	26 yr	VII	1.5 cm	+	1 cm		
Pt 887-VVF 1030	15 yr	II	2 cm	+	1 cm		
Pt 888-VVF 1032	21 yr	I	5 cm		5 cm		

patient-operation	age	P	fist size	circum defect	EUOF dist	blad pro	prev op
Pt 892-VVF 1038	34 yr	I	1 cm		3 cm		5x
Pt 894-VVF 1041	18 yr	II	2 cm	+	2 cm		
Pt 895-VVF 1042	14 yr	I	5 cm	+	2.5 cm		
Pt 896-VVF 1044	22 yr	II	2 cm		4 cm		
Pt 897-VVF 1046	18 yr	I	1.5 cm		3 cm		
Pt 898-VVF 1048	32 yr	III	8 cm	+	1 cm		
Pt 899-VVF 1049	30 yr	IV	1.5 cm		4 cm		1x
Pt 902-VVF 1053	14 yr	I	2 cm	+	3 cm		
Pt 903-VVF 1054	22 yr	II	6 cm		4 cm	+	
Pt 904-VVF 1055	23 yr	I	0.8 cm		4 cm		
Pt 905-VVF 1056	18 yr	III	5 cm		0.5 cm	+	
Pt 906-VVF 1058	23 yr	VII	5 cm		5 cm		
Pt 907-VVF 1059	19 yr	I	3 cm	+	1 cm		1x
Pt 909-VVF 1062	15 yr	I	2 cm		4 cm		
Pt 910-VVF 1063	13 yr	I	3 cm	+	1 cm		
Pt 911-VVF 1065	18 yr	II	1.5 cm	+	4 cm		
Pt 913-VVF 1068	14 yr	I	2 cm	+	1.5 cm		
Pt 914-VVF 1070	14 yr	I	3 cm	+	3 cm		
Pt 916-VVF 1073	28 yr	III	8 cm	+	2.5 cm	+	
Pt 917-VVF 1074	16 yr	II	8 cm	+	4 cm		
Pt 918-VVF 1076	14 yr	I	6 cm	+	3 cm		
Pt 920-VVF 1078	17 yr	II	0.6 cm	+	2 cm		
Pt 921-VVF 1079	14 yr	I	5 cm	+	1 cm	+	
Pt 923-VVF 1083	24 yr	III	6 cm	+	2 cm		
Pt 924-VVF 1084	31 yr	IX	4 cm	+	5 cm		
Pt 925-VVF 1085	27 yr	I	6 cm	+	2.5 cm		
Pt 928-VVF 1090	35 yr	II	0.1 cm		2 cm		1x
Pt 929-VVF 1091	24 yr	I	3.5 cm		2 cm		1x
Pt 930-VVF 1092	14 yr	I	2 cm	+	3.5 cm		
Pt 932-VVF 1094	19 yr	III	0.5 cm		3 cm		

P = parity; fist size = size of fistula; circum defect = circumferential defect; EUOF dist = distance between external urethra opening and fistula edge; blad pro = bladder prolapse through fistula; prev op = previous operation

All the 150 fistulae were due to obstetric complications. Two patients, viz. Pt 786 and Pt 823, claimed they started to leak following their first sexual intercourse; however, they had a typical obstetric fistula.

The patients were divided into: group IIaa. 76 patients (50.7%) without a circumferential defect and group IIab. 74 patients (49.3%) with a circumferential defect.

Inversion of the anterior bladder wall with prolapse through the fistula (Fig. 21+22) was seen in 21 patients (14%): in 11 patients without a circumferential defect and in 10 patients with a circumferential defect.

The size of the fistula varied from 1 mm up to 8 cm; it was considered to be small (up through 1 cm) in 40 patients (26.7%), moderate (2-3 cm) in 67 patients (44.7%), large (4-5 cm) in 29 patients (19.3%) and extensive (more than 5 cm) in 14 patients (9.3%).

To show the involvement of the closing mechanism, the distance of the external urethra opening to the fistula edge has been listed separately in Table XXXI. Only 40 patients (19.3%) had a urethra of normal length (4 cm).

Table XXXI
distance between external urethra opening and fistula edge

distance	number of patients	%
0.5 cm	2	1.3
1 cm	17	11.3
1.5 cm	13	8.7
2 cm	27	18.0
2.5 cm	7	4.7
3 cm	33	22.0
3.5 cm	1	0.7
4 cm	38	25.3
5 cm	12	8.0
total	150	100.0

methods

Preoperative preparation, anesthesia, operation facilities, position on the operation table, approach route etc. were the same as for the first 500 patients. The only difference was that the patients were nursed postoperatively in the new VVF-ward instead of in the female leprosy ward.

A. The general operation technic was as follows. A small median or large (bi)lateral episiotomies were performed to obtain good accessibility. If necessary as in very extensive fistulae, the ureter(s) were catheterized for 20 cm. A circumferential incision was made at the fistula edge with bilateral transverse incisions of the anterior vaginal wall. Then the anterior vaginal wall was dissected widely from the bladder and from (what was left of) the urethra. If necessary, the bladder was dissected from the cervix. The bladder neck was dissected sharply and bluntly from the pubic bones in such a way that the paravesical spaces were completely opened and that the dissecting finger was in contact with the posterior side of the abdominal muscles. At the end of the extensive

dissection the bladder neck was free for 3/4 of its circumference. A FOLEY catheter Ch 16, or another size if not available, was inserted into the bladder. Two chromic catgut #1 anchoring sutures were placed on each side of the bladder, the first as far antero-superiorly as possible through the periost at the back of the superior pubic bone and the second through the pubococcygeus muscle next to it. For this a special instrument, a small sharp DESCHAMPS aneurysm needle, was used. Even following this extensive dissection, transverse closure seemed to be the logical way. Closure of the bladder was performed with a single layer of interrupted inverting chromic catgut #0 sutures, always working from lateral to medial. In the extensive fistulae the bladder was anchored bilaterally onto the inferior pubic bone and/or symphysis periost in such a way that the ureters were positioned laterally in order to prevent them from ejecting urine straight into the urethra. The last sutures made were to close the bladder onto the urethra with chromic catgut #00. Closure of the bladder was checked by 20 ml gentian violet instillation, and if needed more sutures were applied. A longitudinal incision was made in the right labium majus, and the bulbocavernosus fat/muscle was dissected and mobilized leaving the posterior part from where the blood supply and innervation come intact. The pedicled graft was tunneled under the lateral vaginal wall and fixed bilaterally onto the superior pubic bones periost and pubococcygeus muscles, tightly and transversely over the repair. First it was fixed to the pubic bones periost using the anchoring sutures and then even tightened more by using the sutures through the pubo-coccygeus muscles. The graft was also fixed transversely over the urethra by suturing it onto the opposite site from where the graft was taken. The anterior vaginal wall was closed transversely with interrupted everting chromic catgut #1 sutures. Only the skin of the episiotomies was closed with interrupted supramid #0 sutures, and the vagina packed firmly. The skin of the labium majus was closed with interrupted supramid #0 sutures, and a pressure pad applied over it. For security reasons the FOLEY catheter was fixed bilaterally to the labia majora.
When inversion of the anterior bladder wall with prolapse through the fistula was encountered, it was reduced easily in the exaggerated lithotomy position, and no special measurements were necessary to keep it reduced during operation.
Catheterization of the ureter(s) was performed in 25 (16.7%) out of the 150 patients: in 18 bilaterally, in 4 only the right side and in 3 only the left side.
Longitudinal closure of the bladder was performed in 28 (18.7%) out of the 150 patients.

B. When the anterior vaginal wall had to be reconstructed, the bilateral incisions were extended and a Y incision made midline over the urethra and around the external urethra opening. The anterior and lateral vaginal walls and the skin of both labia were dissected widely bilaterally, even up to 15 cm, together with spatulation of the labia minora. The anterior vaginal wall was reconstructed by advancement of these 2 skin-mucosa flaps into the vagina. Even extensive defects of the anterior vaginal wall could be reconstructed.
Anterior vaginal wall reconstruction with the technic described was performed in 38 (25.3%) out of the 150 patients.

A photographic documentation of the technics A+B is presented in Fig. 25-40.

results

A. The results of the first operation in these 150 patients have been listed in Table XXXII; for group IIaa in Table XXXIII; and for group IIab in Table XXXIV.

Table XXXII
results of first operation

result			number	%
fistula closed			128	85.3
continent	113	75.3%		
incontinent	15	10.0%		
fistula not closed			19	12.7
dead			3	2.0
		total	150	100.0

Table XXXIII
fistulae without a circumferential defect

result			number	%
fistula closed			67	88.2
continent	63	82.9%		
incontinent	4	5.3%		
fistula not closed			7	9.2
dead			2	2.6
		total	76	100.0

Table XXXIV
fistulae with a circumferential defect

result			number	%
fistula closed			61	82.4
continent	50	67.6%		
incontinent	11	14.9%		
fistula not closed			12	16.2
dead			1	1.4
		total	74	100.0

The primary closure rate at first attempt was 128 (85.3%) out of the 150 patients in this series:
IIaa. 67 (88.2%) of the 76 patients without a circumferential defect; and
IIab. 61 (82.4%) of the 74 patients with a circumferential defect.

The primary incontinence rate at first attempt was 15 (11.7%) out of the 128 closed fistulae:

IIaa. 4 (6.0%) out of the 67 closed fistulae involving the closing mechanism without a circumferential defect; and

IIab. 11 (18.0%) out of the 61 closed fistulae involving the closing mechanism with a circumferential defect.

There were 8 patients with minimal incontinence and 2 patients where the distal urethra had been lost but who were completely continent; all those 10 patients were considered to be closed and continent to have the same criteria as applied in the first 500 patients.

To come to a better understanding why urinary (stress) incontinence developed in 15 patients once the fistula was closed, they are listed together with relevant data in Table XXXV.

Table XXXV
postoperative urinary (stress) incontinence

patient-operation	age	P	fist size	circum defect	EUOF dist	prev op
Pt 713-VVF 816	21 yr	II	1.5 cm		3 cm	
Pt 725-VVF 831	17 yr	III	1.5 cm	+	1.5 cm	
Pt 767-VVF 876	27 yr	III	3 cm	+	1.5 cm	
Pt 768-VVF 877	20 yr	I	1 cm		3 cm	1x
Pt 790-VVF 903	61 yr	VII	2 cm	+	2 cm	
Pt 804-VVF 922	33 yr	II	1 cm	+	4 cm	1x
Pt 832-VVF 954	17 yr	II	4 cm	+	1.5 cm	
Pt 844-VVF 967	23 yr	I	2 cm		2 cm	2x
Pt 865-VVF 999	21 yr	III	4 cm	+	1.5 cm	
Pt 880-VVF 102	15 yr	I	0.5 cm		0.5 cm	4x
Pt 882-VVF 1024	22 yr	V	2.5 cm	+	1 cm	2x
Pt 887-VVF 1030	15 yr	II	2 cm	+	1 cm	??
Pt 907-VVF 1059	19 yr	I	3 cm	+	1 cm	1x
Pt 916-VVF 1073	28 yr	III	8 cm	+	2.5 cm	
Pt 925-VVF 1085	27 yr	I	6 cm	+	2.5 cm	

P = parity; fist size = size of fistula; circum defect = circumferential defect; EUOF dist = distance between external urethra opening and fistula edge; prev op = previous operation

The urethra was (severely) shortened in 14 patients (93.3%), and the one with a normal urethra had a circumferential defect at the UV-junction and had been operated already 1x elsewhere.

There was a circumferential defect in 11 (73.3%) out of the 15 patients; 6 patients (40.0%) had been operated previously elsewhere; and 1 patient, Pt 916-VVF 1073, became incontinent because the urethra was retracted into the vagina.

Of the 21 patients with inversion of the bladder and prolapse of the anterior bladder wall through the fistula, 14 were closed and continent, 2 were closed and incontinent, in 3 the repair broke down completely and in 2 there was a small residual fistula.

In 6 (4.0%) out of the 150 patients the (distal) urethra was lost postoperatively; and in 4 of them the repair had broken down as well. However, in the other 2 patients, viz. Pt 742-VVF 848 and Pt 760-VVF 869, the repair had taken and they were completely continent. For a better understanding, the relevant particulars of these patients are listed in Table XXXVI.

Table XXXVI
postoperative (distal) urethra loss

patient-operation	age	fist size	circum defect	EUOF dist	prev op
Pt 731-VVF 837	22 yr	3 cm	+	1 cm	1x
Pt 742-VVF 848	25 yr	1 cm		1.5 cm	
Pt 760-VVF 869	17 yr	3 cm		1 cm	
Pt 817-VVF 939	14 yr	3 cm	+	1 cm	
Pt 845-VVF 968	16 yr	5 cm	+	2 cm	
Pt 917-VVF 1074	16 yr	8 cm	+	4 cm	

fist size = size of fistula; circum defect = circumferential defect; EUOF dist = distance between external urethra opening and fistula edge; prev op = previous operation

Out of the 28 patients in whom the bladder had been closed longitudinally, 25 were closed and continent, 1 was closed and incontinent, 1 was not closed and 1 died. The patient who was incontinent, Pt 880-VVF 1021, had been operated 4x previously; she said she was only leaking little, but always.

B. The results of the anterior vaginal wall reconstruction in the 38 patients are listed in Table XXXVII.

Table XXXVII
anterior vaginal wall reconstruction

result		number	%
taken, no (U)VVF		27	71.1
taken, but (U)VVF		7	18.4
completely broken down		3	7.9
postoperative death		1	2.6
	total	38	100.0

The anterior vaginal wall had taken in 34 (89.5%) and had broken down completely in 3 (7.9%) out of the 38 patients. The particulars of these 3 patients are given in Table XXXVIII.

Table XXXVIII
repair completely broken down

patient-operation	age	fist size	circum defect	blad pro	prev op
Pt 734-VVF 840	52 yr	4 cm	+	+	1x
Pt 791-VVF 904	18 yr	5 cm	+	+	1x
Pt 833-VVF 955	27 yr	6 cm	+	+	

fist size = size of fistula; circum defect = circumferential defect; blad pro = bladder prolapse through fistula; prev op = previous operation

intraoperative complications

At the extensive dissection of the anterior vaginal wall the bladder or urethra was traumatized further in 4 (2.7%) out of the 150 VVF-repairs; this was closed at the same operation session.

At the extensive dissection of the bladder from the inferior pubic bones, the lateral bladder wall was traumatized further in 4 (2.7%) out of the 150 VVF-repairs; this could not be repaired in 2 patients. The first patient, Pt 752-VVF 861, in whom this happened developed urosepsis due to leaking of urine into the paravesical space; despite opening and drainage this patient died 5 days following operation. Therefore later on when this happened suprapubic drains were placed bilaterally into the paravesical spaces, and urosepsis due to this complication was not seen anymore.

In one patient with a double fistula, Pt 923-VVF 1083, the repair of the vesicocervicovaginal fistula had to be undone at the end of the operation on the suspicion that both ureters had been ligated because there was no urine flow whatsoever, not even following 2500 ml intravenous fluids.

postoperative complications

The most serious postoperative complication was death which occurred in 3 patients, from 4 to 14 days following operation, as listed in Table XXXIX. This stands for a postoperative mortality rate of 2.0%.

Table XXXIX
postoperative mortality

patient-operation	age	cause of death	interval
Pt 752-VVF 861	37 yr	urosepsis	5 days
Pt 762-VVF 871	21 yr	thromboembolism	4 days
Pt 808-VVF 928	35 yr	(uro)sepsis	14 days

The last patient Pt 808-VVF 928 was completely alright until 14 days following operation when she developed high fever without any sign of meningitis and died despite chloroquine, penicillin and streptomycin.

Wound infection, as looked for 3 weeks postoperatively, was noted in 5 (3.3%) out of the 150 patients.

DISCUSSION

A. The theoretic advantages of this technic are: 1. due to the extensive dissection of the bladder the defect a. becomes smaller and b. is closed easier without tension; and 2. the bulbocavernosus graft a. brings a new blood supply to the operation area, b. covers the repair, c. prevents contact between bladder mucosa and anterior vaginal wall mucosa, d. fills up the dead space, e. contributes to a better continence by elevation of the bladder neck/ UV-junction/proximal urethra and f. acts as a polster at sexual intercourse and at following deliveries.
The theoretic disadvantages are: 1. the extensive dissection of the anterior vaginal wall may a. traumatize the bladder, the urethra or the anterior vaginal wall and/or b. lead to necrosis of the anterior vaginal wall; 2. the extensive dissection of the bladder from the inferior pubic bones may traumatize the bladder; 3. the more extensive dissection leads to larger wound beds and so to more bleeding, infection and breakdown of the repair, and to more scarring of the closing mechanism; and 4. the different fixation of the bulbocavernosus fat/muscle graft a. is difficult, b. needs a special instrument and c. takes more time.
The elevation obtained might be compared with that of other surgical technics (BURCH, 1961) as used in incontinence operations.

The primary closure rate in the 150 patients of this series was slightly lower than in the 288 patients of the first series with a fistula involving the closing mechanism without urethra loss, though in the same range, viz. 85.3% versus 88.5%.

The postoperative mortality rate was the same, viz. 2.0% in this series versus 2.1% in the first series for fistulae involving the closing mechanism without urethra loss.

The outcome as to continence in the 150 patients of this series was slightly better than in the 288 patients of the first series with fistulae involving the closing mechanism without urethra loss, the primary incontinence rate being 11.7% versus 14.5%. This is an indication that even with this high elevation of the bladder neck there is only a slight improvement of the outcome as to continence.
This is not surprising considering the fact that in this series of 150 patients, only 40 (26.7%) had a urethra of normal length (at least 4 cm) and that 74 (49.3%) had a circumferential defect at the bladder neck/UV-junction/proximal urethra.
It is more surprising that still so many were continent which might have been due to the high elevation of the bladder neck by this technic.
Theoretically, the highest elevation possible is by fixation of the bulbocavernosus fat/muscle graft bilaterally onto the back of the abdominal musculature; this is worked out at present.

The extensive dissection of the anterior vaginal wall from the urethra led to necrosis of the (distal) urethra in 6 patients despite the "protective" effect of the bulbocavernosus fat/muscle graft. Only one patient had a normal 4-cm-long urethra before operation, but a very extensive fistula of 8 cm; and in the other five patients the urethra had been damaged already severely even before operation. Still two patients were completely continent.

The patients without a circumferential defect at bladder neck/UV-junction/proximal urethra had at first attempt a better outcome as to closure and to continence than patients with a circumferential defect: primary closure rate of 88.3% versus 82.3%; and primary incontinence rate of 6.0% versus 18.0%.

The patients with a fistula not involving the closing mechanism in the first series had a better outcome at first attempt than the patients in this series without a circumferential defect: primary closure rate of 90.4% versus 88.3%; and primary incontinence rate of 1.4% versus 6.0%

The patients with a circumferential defect in this series had a better outcome at first attempt than the patients with urethra loss in the first series: primary closure rate of 82.3% versus 76.8%; and primary incontinence rate of 16.0% versus 20.9%.

From these results it seems that the outcome worsens progressively from I. fistulae not involving the closing mechanism to IIaa. fistulae involving the closing mechanism without urethra loss and without a circumferential defect to IIab. fistulae involving the closing mechanism without urethra loss but with a circumferential defect to IIb. fistulae involving the closing mechanism with urethra loss.

The good results in the patients without a circumferential defect might have been due to the high elevation of the bladder neck by this technic. Also the anterior and most of the lateral bladder walls are intact. So the closing mechanism can be restored completely circumferentially with functional bladder musculature.

The bad results in the patients with a circumferential defect can be explained as following. Breakdown is due to the fact that only the lateral and posterior bladder walls are closed whilst the gap in the anterior wall is filled up with scar tissue. Incontinence is due to the fact that 1. the closing mechanism is lost circumferentially and 2. continuity

cannot be restored completely circumferentially with functional bladder musculature. Even in these patients the primary incontinence rate was "only" 18.0% which might have been due to the high elevation of the bladder neck by this technic.

B. The theoretic advantages of this anterior vaginal wall reconstruction are: 1. due to the wide mobilization of the skin-mucosa the anterior vaginal wall can be closed easier; 2. even big defects of the anterior vaginal wall can be closed; 3. it gives a better functional result of the vagina; and 4. it gives a good symmetric cosmetic result of the vulva. The theoretic disadvantages are: 1. the extensive dissection may lead to necrosis of the mobilized skin-mucosa flaps; and 2. there is more chance of bleeding, infection and breakdown.

The wide mobilization of the skin-mucosa flaps, even up to 15 cm, seems to be safe, as in only 3 (7.9%) out of the 38 patients the whole repair broke down.

The functional lengthening of the vagina as obtained by this reconstructive plastic procedure could not be measured objectively.

Chapter IV
operation technic and results in 25 VVF-patients with fistulae involving the closing mechanism with urethra loss

introduction

When the bulbocavernosus fat/muscle graft is sutured longitudinally over the (neo)urethra, it is not possible to elevate the bladder neck/UV-junction/proximal urethra properly.
In analogy with the different fixation of the bulbocavernosus fat/muscle graft as described in Chapter III, it was thought worthwile to use this fixation also in VVF-patients with a (sub)total loss of the urethra covering the (neo)urethra transversely instead of longitudinally and elevating the bladder neck towards the back of the symphysis.
A prospective study was started in January 1988 to find out if this fixation is of use in urethra reconstruction.

materials

From January to November 1988, twenty-five consecutive patients with (sub)total loss of the urethra, whatever the cause and irrespective of previous operations, were operated in order to reconstruct the urethra.

There were 16 obstetric fistulae including the 2 yankan gishiri fistulae by the unguzoma, 7 yankan gishiri fistulae including the 2 obstetric fistulae and 4 miscellaneous fistulae.

In 10 patients a circumferential defect at the bladder neck/UV-junction/proximal urethra was seen.

Pt 709 and Pt 850 were the only 2 patients seen during the 5-year period with a VVF and urethra loss due to a yankan gishiri by the unguzoma because of obstructed labor.
Pt 556 developed urethra loss following 2x VVF-repair.
Pt 798 developed a VVF with urethra loss at the age of 9 years following measles.
Pt 856 told all kinds of things, but persisted that the VVF with urethra loss developed following pain right loin and cough; she had had a successful VVF-repair as well in the past.
Pt 625 was one of the worst fistulae encountered (Fig. 23+24); at a previous operation the bladder had been fixed to the symphysis.

Pt 859 developed a VVF with urethra loss and a RVF at the age of 2 years following a period of high fever.
In patient 891 a ureterosigmoidostomy had been performed only at the left side elsewhere, and she was leaking urine through the anus and through the vagina.
Pt 845 developed urethra loss when the whole repair broke down following 1x VVF-repair.

The relevant data of all these patients are given in Table XL.

Table XL
fistulae with (sub)total urethra loss

patient	age	fist size	prev op	dist CF/VF	cause
Pt 709	19 yr	5 cm	1x	7 cm	obstetric, yankan gishiri
Pt 710	27 yr	8 cm	2x	1 cm	obstetric
Pt 556	56 yr	5 cm	2x	4 cm	obstetric, 2x VVF-repair
Pt 771	31 yr	6 cm		5 cm	yankan gishiri
Pt 781	22 yr	6 cm		7 cm	yankan gishiri
Pt 561	21 yr	5 cm	1x	6 cm	yankan gishiri
Pt 792	22 yr	5 cm		8 cm	yankan gishiri
Pt 798	32 yr	2 cm	2x	8 cm	high fever + passing of stone
Pt 819	14 yr	3 cm		2 cm	obstetric
Pt 825	15 yr	5 cm		8 cm	obstetric
Pt 569	14 yr	4 cm	2x	1 cm	measles at age 9 yr
Pt 850	30 yr	2 cm		8 cm	obstetric, yankan gishiri
Pt 851	12 yr	5 cm		6 cm	yankan gishiri
Pt 856	32 yr	6 cm		6 cm	pain R loin + cough
Pt 594	15 yr	5 cm	1x	4 cm	obstetric
Pt 859	11 yr	2 cm		1 cm	high fever at age 2 yr, also RVF
Pt 465	28 yr	2.5 cm	1x	4 cm	obstetric, VVF-repair + fever
Pt 473	17 yr	6 cm	1x	1 cm	obstetric
Pt 318	25 yr	6 cm	1x	3 cm	obstetric
Pt 625	15 yr	6 cm	1x	1 cm	obstetric
Pt 543	27 yr	8 cm	2x	- cm	obstetric
Pt 891	26 yr	10 cm	2x	- cm	obstetric
Pt 845	16 yr	5 cm	1x	1 cm	obstetric, VVF-repair
Pt 542	19 yr	4 cm	1x	1 cm	obstetric
Pt 927	27 yr	3 cm	1x	8 cm	obstetric

fist size = fistula size; prev op = previous operation; dist CF/VF = distance between cervix or vaginal vault and fistula edge

methods

Preoperative preparation, anesthesia, operation facilities, position on the operation table, approach route etc. were the same as for the first 500 patients. The only difference was that these patients were nursed postoperatively in the new VVF-ward. The operation technic was the following: A small median or large (bi)lateral episiotomies were made to obtain good accessibility. If necessary as in very large fistulae, the ureter(s) were catheterized for 20 cm. Then a U incision was made around the bladder opening and bilaterally from the urethra roof, if still present; with bilateral transverse extensions at the base. The distance between the legs of the U incision should be 22-25 mm. The anterior vaginal wall or scar tissue of the U incision was dissected bi-laterally free leaving it fixed to the symphysis in the midline. The lateral and anterior vaginal walls were dissected and mobilized extensively from the lateral sides and from the bladder. The bladder (neck) was dissected completely from the pubic bones. Two chromic catgut anchoring sutures were placed at each side of the bladder, through the periost at the back of the superior pubic bone and through the pubococcygeus muscle next to it. A FOLEY catheter Ch 16, or if not available another size, was inserted into the bladder. If a VVF was present as well, the bladder was fixed bilaterally onto the symphysis periost. The urethra was reconstructed longitudinally over the catheter with interrupted inverting chromic catgut #00 using the mobilized tissue of the U incision, starting with rhaphy of the bladder neck. Reconstruction was performed over a minimum of 4 cm, if possible, working from proximal towards distal, special attention being given to the UV-junction. Closure was checked by 20 ml gentian violet instillation into the bladder. The catheter should be moving freely inside the (neo)urethra. The paraurethral muscles, if present, were incised bilaterally and longitudinally up to the symphysis and sutured over the repair to provide the (neo)urethra with a muscular coat. The bulbocavernosus fat/muscle graft was dissected and fixed transversely over the whole repair and onto the pubic bones periost and puboccygeus muscles exactly as described in Chapter III, special care being taken that it covered the neourethra completely. The anterior vaginal wall was closed in the form of an inverted Y or mercedes benz star. Only the skin of the episiotomies was closed and the vagina packed firmly. The skin of the labium was closed and a pressure pad applied over it. The FOLEY catheter was fixed bilaterally to the labia majora.
One of the problems was that, especially in the obstetric fistulae, there was necrosis of the deep transverse perineal muscle, paraurethral muscles and urethra roof leaving almost no material for reconstruction as only scar tissue was covering the symphysis at the UV-junction and proximal urethra. It was then very difficult to reconstruct the proximal urethra and UV-junction and impossible to provide the (neo)urethra with a muscular coat.
Due to the above-mentioned, the full technic as described could not be performed in every patient, but the same principles were applied in all 25 patients.

A photographic documentation of the technic is presented in Fig. 41-56.

results

The results of this operation technic for urethra reconstruction in these 25 patients are listed in Table XLI.

Table XLI
results of urethra reconstruction

result			number
successful urethra reconstruction			19
continent	15		
incontinent	4		
unsuccessful urethra reconstruction			5
postoperative death			1
		total	25

At first attempt the urethra reconstruction was successful in 19 patients, with continence in 15 and with incontinence in 4; was unsuccessful in 5 patients; and 1 patient died postoperatively.

For a better understanding all the patients are listed according to the outcome as following.

The 15 patients in whom the reconstruction was successful and who were continent are listed in Table XLII with relevant data.

The 4 patients in whom the reconstruction was successful but who were incontinent are listed in Table XLIII with relevant data.

The 5 patients in whom the reconstruction broke down are listed in Table XLIV with relevant data.

One patient, viz. Pt 710-VVF 812, died from urosepsis, 5 days following operation, and her relevant data are listed in Table XLV.

Table XLII
successful reconstruction and continent

patient-operation	fist size	circum defect	dist CF/VF	prev op	cause
Pt 709-VVF 811	5 cm		7 cm	1x	obstetric, yankan gishiri
Pt 771-VVF 880	6 cm		5 cm		yankan gishiri
Pt 781-VVF 892	6 cm		7 cm		yankan gishiri
Pt 792-VVF 906	5 cm		8 cm		yankan gishiri
Pt 819-VVF 941	3 cm	+	2 cm		obstetric
Pt 825-VVF 947	5 cm	+	8 cm		obstetric
Pt 569-VVF 961	4 cm	+	1 cm	2x	measles
Pt 850-VVF 974	2 cm		8 cm		obstetric, yankan gishiri
Pt 851-VVF 976	5 cm		6 cm		yankan gishiri
Pt 856-VVF 982	6 cm	+	6 cm		pain R loin + cough
Pt 859-VVF 988	2 cm	+	1 cm		high fever at age 2 yr
Pt 465-VVF 991	2.5 cm		4 cm	1x	high fever, VVF-repair
Pt 625-VVF 1003	6 cm	+	1 cm	1x	obstetric/2nd stage
Pt 845-VVF 1039	5 cm	+	1 cm	1x	obstetric, VVF-repair
Pt 542-VVF 1086	4 cm	+	1 cm	1x	obstetric, VVF-repair

fist size = size of fistula; circum defect = circumferential defect; dist CF/VF = distance between cervix or vaginal vault and fistula edge; prev op = previous operation

Table XLIII
successful reconstruction, but incontinent

patient-operation	fist size	circum defect	dist CF/VF	prev op	cause
Pt 556-VVF 813	5 cm	+	4 cm	2x	obstetric
Pt 594-VVF 983	5 cm	+	4 cm	1x	obstetric
Pt 318-VVF 1002	6 cm	+	3 cm	1x	obstetric
Pt 891-VVF 1037	10 cm	+	- cm	2x	obstetric

for legend see Table XLII

Table XLIV
unsuccessful reconstruction

patient-operation	fist size	circum defect	dist CF/VF	prev op	cause
Pt 561-VVF 898	5 cm		6 cm	1x	yankan gishiri
Pt 798-VVF 916	2 cm		8 cm	2x	high fever, stone
Pt 473-VVF 997	6 cm	+	1 cm	1x	obstetric
Pt 543-VVF 1014	8 cm	+	- cm	2x	obstetric
Pt 927-VVF 1089	3 cm		8 cm	1x	obstetric

for legend see Table XLII

Table XLV
postoperative mortality

patient-operation	fist size	circum defect	dist CF/VF	prev op	cause
Pt 710-VVF 812	8 cm	+	1 cm	2x	obstetric

for legend see Table XLII

DISCUSSION

Before we come to the discussion it should be understood that no selection whatsoever was made in these 25 patients, and also that no reliable statistical evaluation is possible as the number is too small.

All the 25 patients were considered to have been operated by one technic, as the principles were the same for the full technic and no full technic.

It was felt that in urethra reconstruction there was a need for atraumatic suturing material for the first layer; this was not available.

The reasoning of this technic was: to reconstruct a normal-length (4-cm-long) urethra, to provide this (neo)urethra with a muscular coat from the paraurethral muscles, to arrange the closing mechanism by rhaphy of the bladder neck, to cover the repair and to bring a new blood supply to the operation area by the bulbocavernosus fat/muscle graft and to elevate the bladder neck/UV-junction/proximal urethra as high as possible against the back of the symphysis by using the bulbocavernosus fat/muscle as a tight sling fixed onto the superior pubic bones periost.

The results were similar to those in the first 56 patients. Only the fixation of the bulbocavernosus fat/muscle was different. Considering the complexity of factors and lesions in fistulae involving the (sub)total urethra and the small number of patients it is not possible to compare those 2 groups or to compare the results with results in the literature. For theoretic reasons I prefer the transverse fixation of the bulbocavernosus fat/muscle as described.

The results were clearly below those of fistulae without (sub)total urethra loss. This is due to the technical difficulties of the operation and to the fact that thin scar tissue has to be used as material to reconstruct the urethra, that the UV-junction has to be reconstructed, that it is not possible to restore a functional closing mechanism if no muscle tissue is available, and that the catheter is irritating and pressing directly on the line of sutures. This also explains that the results were even worse than in fistulae involving the closing mechanism with a circumferential defect in the previous series of 150 patients in Chapter III.

Also in this series the outcome as to incontinence was worse in the fistulae with a circumferential defect, as all the 4 patients who became incontinent had a circumferential defect. However, for a statistical evaluation this series is too small.

The variety of anatomic and functional tissue loss was such that it was not possible to determine prognostic factors.

All in all it can be stated that whenever there is a (sub)total loss of the urethra the prognosis becomes very poor as compared to the other fistulae.

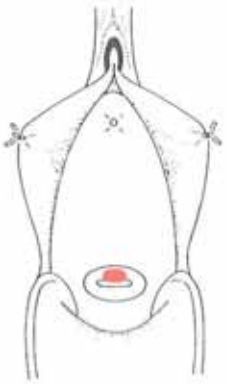


Fig. 1 a + b Vesicocervico(utero)vaginal fistula

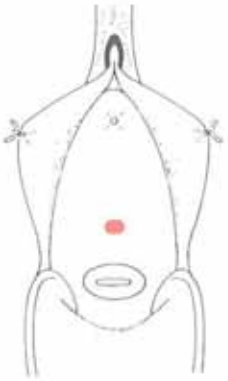
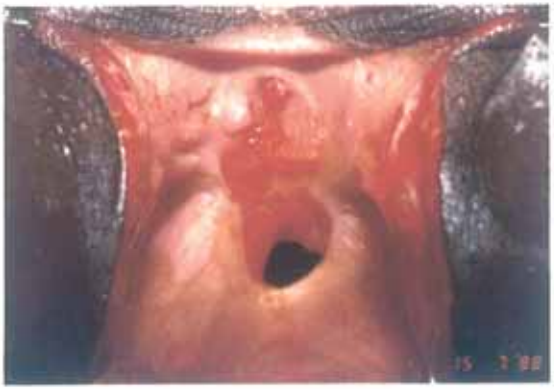


Fig. 2 a + b Vesicovaginal fistula

Fig. 3 a + b (Urethro)vesicovaginal fistula



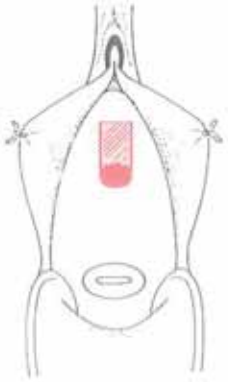


Fig. 4 a + b Urethro(vesico)vaginal fistula

Fig. 25 (Urethro)vesicovaginal fistula

Fig. 26 Detail

Fig. 27 Incision

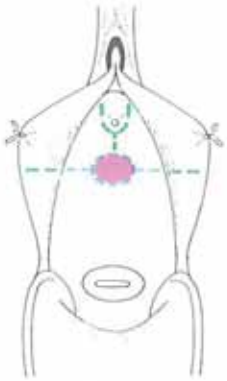


Fig. 28 Standard incision(s)

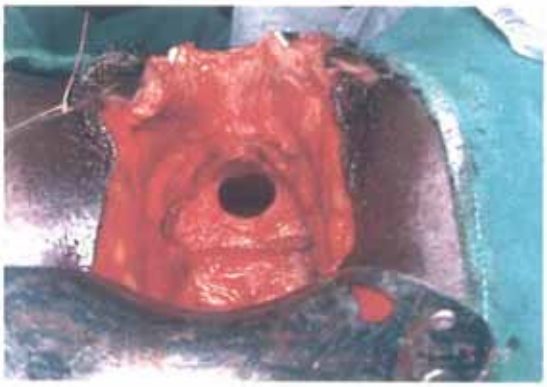


Fig. 29 Anterior vaginal wall dissection

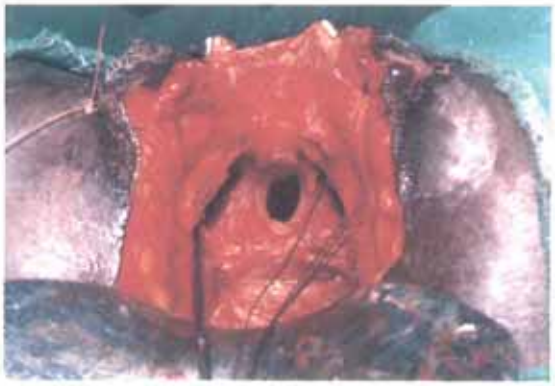


Fig. 30 Bladder (neck) dissection

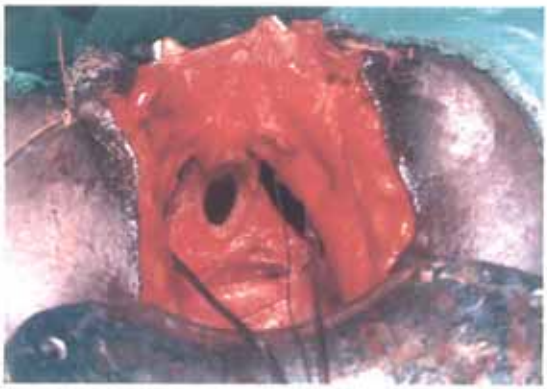


Fig. 31 Left paravesical space

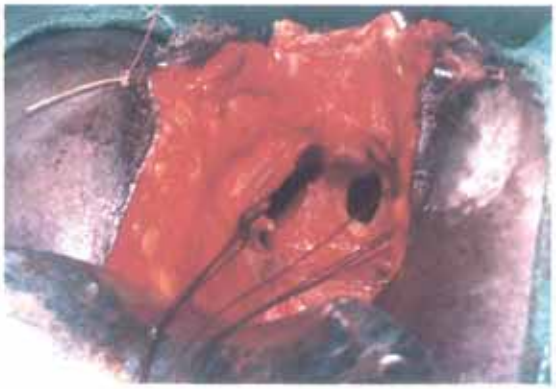


Fig. 32 Right paravesical space

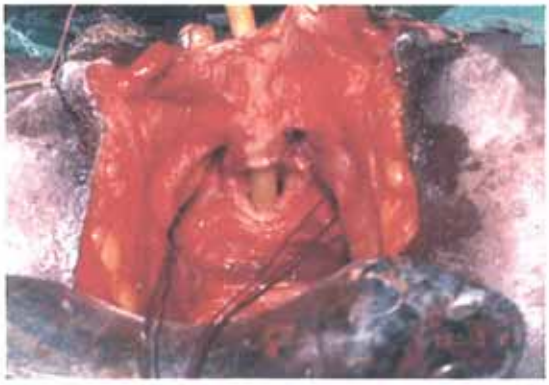


Fig. 33 Closure of bladder

Fig. 34 Closure of bladder completed

Fig. 35 Bulbocavernosus graft tunneling

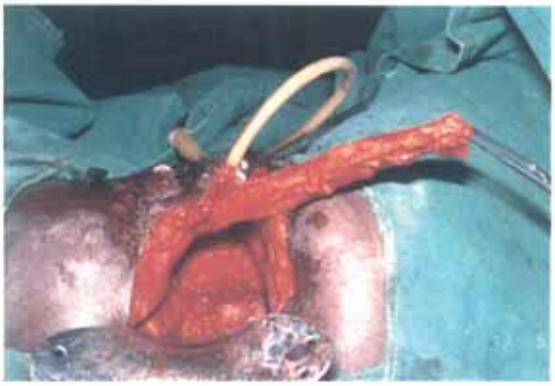


Fig. 36 Tunneling completed

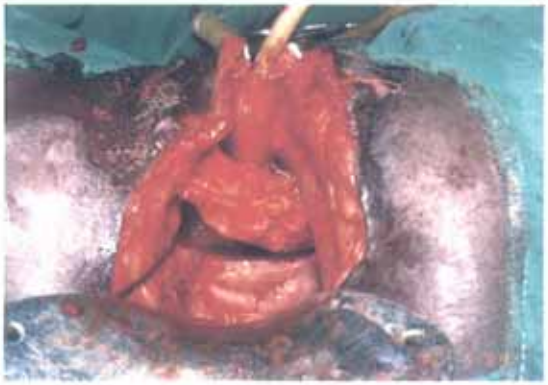


Fig. 37 Fixation of graft

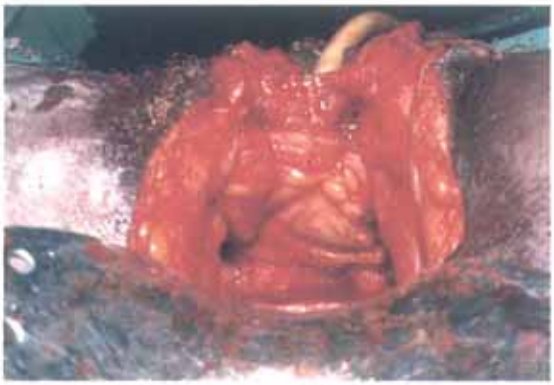


Fig. 38 Fixation completed

Fig. 39 Bilateral skin-mucosa flaps

Fig. 40 Anterior vaginal wall reconstructed

Fig. 9 Mutiple fistulae

Fig. 10 Urine-induced dermatitis

Fig. 11 Rectovaginal fistula

Fig. 12 Sphincter ani rupture

Fig. 13 Loss of labia minora

Fig. 14 Vagina stenosis

Fig. 15 Peroneal paralysis with clawtoes

Fig. 16 Ulcer over sacrum

Fig. 17 Ulcer over major trochanter

Fig. 18 Ureter catheterization

Fig. 19 Vagina atresia

Fig. 20 Circumferential defect

Fig. 21 Bladder prolapse

Fig. 22 Bladder prolapse through vulva

Fig. 23 View from the left side, Pt 625

Fig. 24 View from the right side, Pt 625

Fig. 41 Urethro(vesico)vaginal fistula

Fig. 42 Detail

Fig. 43 Incision

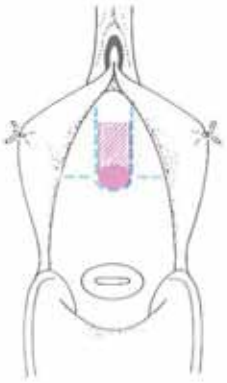


Fig. 44 Standard incision

Fig. 45 Left paravesical space

Fig. 46 Right paravesical space

Fig. 47 Urethra reconstruction, first layer

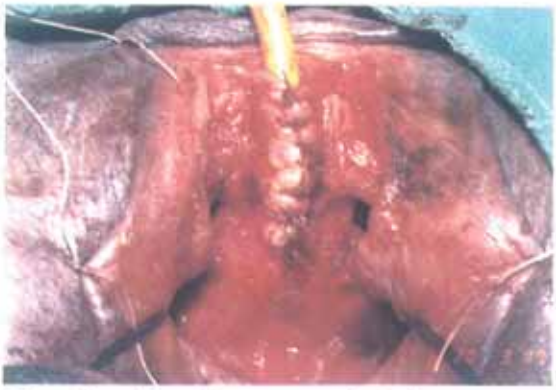


Fig. 48 First layer completed

Fig. 49 Second layer

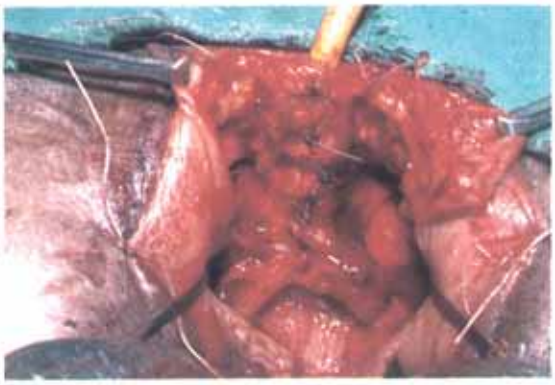


Fig. 50 Second layer completed

Fig. 51 Bulbocavernosus graft

Fig. 52 Tunneling completed

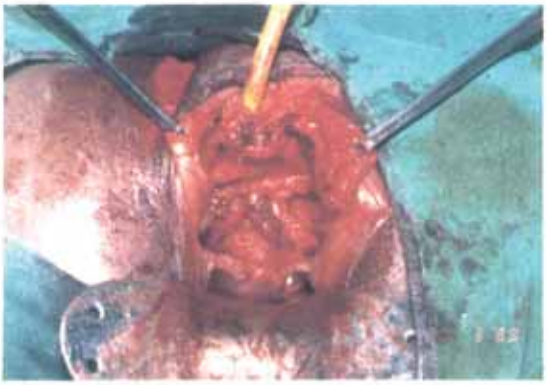


Fig. 53 Fixation of graft

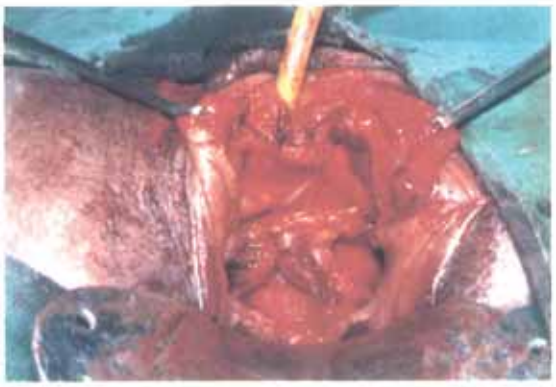
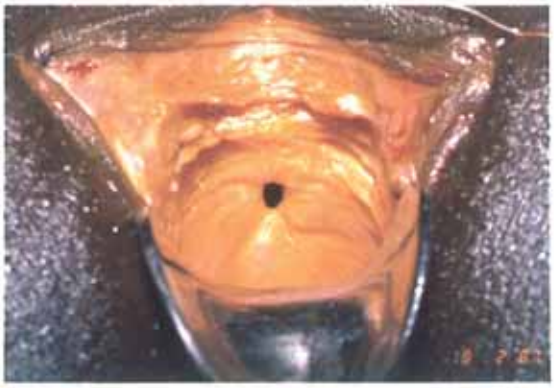


Fig. 54 Fixation completed

Fig. 55 Urethra reconstruction completed

Fig. 56 Vagina pack, pressure pad



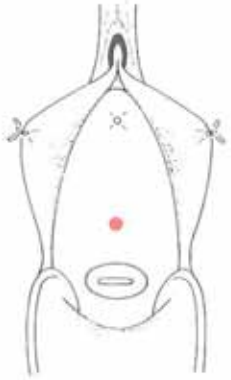


Fig. 5 a + b Small fistula

Fig. 6 a + b Moderate fistula

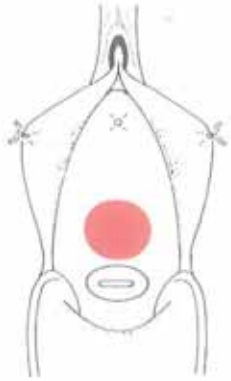


Fig. 7 a + b Large fistula

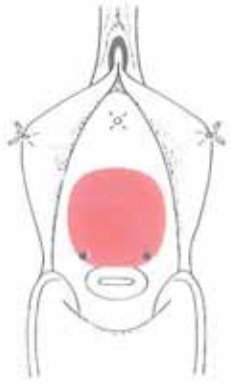


Fig. 8 a + b Extensive fistula

Chapter V
anesthesia in 1,110 VVF-repairs and related operations

introduction

In developing countries there are many problems with the anesthesia due to lack of personnel, training, equipment, materials, drugs and money. Many times the surgeon himself is responsible for the anesthesia.

General anesthesia is complicated and expensive needing an anesthetic machine, anesthetic fluids, ether or halothane, oxygen, a variety of drugs for inducing anesthesia and relaxation, special skill, different tubes for intubation and well trained personnel. Also for safety reasons intensive monitoring is necessary intra- and postoperatively, especially when the operation lasts long.

There are only very few anesthetists working in developing countries, and most of the time the anesthesia is being given by an anesthetic nurse with all the limitations of this practice.

Due to lack of organization and management, many times the planned operations have to be postponed because one or more of the required things are not available.

The maintenance of the anesthetic equipment is below standard sothat within a short time many faults develop which are mastered with hammer (or stone), screwdriver and plier; leaking tubes are repaired with adhesive plaster.

All these factors combined make general anesthesia a dangerous and risky business in many hospitals in developing countries leading to an unacceptable high rate of anesthesia-caused intra- and postoperative mortality.

Regional anesthesia does not require special equipment, is easy to learn, does not need intensive intra- and postoperative monitoring, is as effective as general anesthesia, does not require electricity, and is safe and cheap.

Therefore spinal anesthesia with the right anesthetic agent seems to be the method of choice in VVF-surgery.

materials

During this 5-year period a total of 1,110 VVF-repairs and related operations were performed in 942 VVF-patients. Only the first patient was operated in general anesthesia, in another hospital; and in one procedure no anesthesia was required. The other 1,108 operations were all performed in spinal anesthesia, the surgeon being his own anesthetist.

methods

No premedication was given in order not to lower the blood pressure before the anesthesia. The blood pressure was measured with the patient lying on her back on the operation table which was slightly tilted at the head side. The patient was instructed to sit on the operation table with the legs straight and to bend forwards holding her feet with both hands. The patient's lower back and the surgeon's hands were disinfected with methylated spirit. A sterilizable spinal needle 20G was introduced between the lumbar vertebrae L3/L4 through the yellow ligament, then turned 90 degrees in order not to pierce but to split the fibers and inserted into the dural sac. To check if the needle opening was in the dural sac, the needle was turned back 90 degrees and the stylet removed. If cerebrospinal fluid was coming out the anesthetic fluid was slowly injected from a 5-ml glass syringe fixing the needle with the left hand sothat it could not move; after each ml it was checked if the needle opening was still in the dural sac by releasing the pressure on the plunger and only if cerebrospinal fluid was flowing into the syringe, the anesthetic fluid was injected further. In the first 221 operations 2 ml of hyperbaric lignocaine 5% was used, but as it is only effective 60-90 min from the time it has been injected, in the other 887 operations 4 ml hyperbaric bupivacaine 0.5% was used. The needle was removed and a spirit-soaked gauze was applied onto the injection mark. The patient was positioned flat on her back on the operation table with a cushion under her head to maximally flex the cervical spinal column. The blood pressure was monitored after 5, 10 and 15 min all the time speaking with the patient to make her feel comfortable. If the systolic blood pressure dropped below 90 mm Hg an intravenous drip was started, and intravenous fluids were given rapidly. The effectiveness of the anesthesia was checked by asking the patient to raise her legs. If she could not lift her legs and the systolic blood pressure was at least 90 mm Hg, after 15 min the operation was proceeded.

In girls below the age of 14 the spinal needle at first try was inserted at L4/L5 or L5/S1 in order to avoid total spinal block.

In patients over 50 years old 0.6 mg atropine sulfate was given intravenously to prevent severe bradycardia.

If at the first try at L3/L4 the needle could not be brought into the dural sac, this was tried again at L2/L3 or L4/L5 or L5/S1. If several tries were unsuccessful the operation was postponed, and after 3 to 5 days the whole procedure was repeated.

If after 15 min the patient still could lift her legs another spinal anesthesia was given with the full dose, preferably at a lower level, but if this was not successful at a higher level.

results

The general anesthesia in the first patient was effective and without any complication.
In only 2 patients the operation had to be postponed because the spinal tab was unsuccessful; a few days later it was successful.
Most of the time there was paralysis of the legs after 5 min. If there was paralysis of the legs, full anesthesia of the legs and operation area was present as well.
In 16 (1.4%) of the 1,108 anesthetic procedures the intradural injection of the spinal anesthetic drug had to be repeated; but the first injection had been given lege artis.
In almost all patients the systolic blood pressure fell preoperatively, but in only 6 (0.5%) out of the 1,108 spinal anesthetic procedures it was necessary to give intravenous fluids because it fell below 90 mm Hg; and in the last 600 procedures this was not necessary anymore. When intravenous fluids were given the patient responded immediately.
A further drop in systolic blood pressure as measured immediately following operation was recorded in most patients. In 20 (1.8%) out of the 1,108 procedures intravenous fluids were given immediately postoperatively either because the systolic blood pressure was below 80 mm Hg with insufficient urine flow through the catheter or to check the urine flow when ligation of the ureters was suspected. When intravenous fluids were given the patient responded very fast. In one patient, viz. Pt 455-VVF 510 with a blood pressure of 80/40 mm Hg after an operation lasting 210 min and an estimated blood loss of ± 300 ml, 3x a cutdown was needed before an intravenous line could be established; she recovered completely following 4000 ml glucose 5% and NaCl 0.9% intravenously.
Intraoperative blood transfusion was not given simply because it was not really necessary; in only one operation the blood loss was estimated up to 500 ml.
In many patients some degree of bradycardia developed, but in the younger patients this needed no correction. In patients above 50 years old this sometimes was troublesome, and therefore these patients were given 0.6 mg atropine sulfate i. v. as soon as the spinal anesthesia had been given.
In some patients nausea developed, but this disappeared spontaneously after 5-10 minutes.
The short duration of lignocaine 5% placed the surgeon under time pressure and made him work against the clock, because the anesthesia was wearing out after 50-60 min operation time. Morphine, 10 mg i. v. and/or 10 mg i. m., had to be given in 22 instances (10.0%) in order to provide the surgeon with some 10-15 more minutes. Twice the operation had to be terminated prematurely.
Therefore from operation 223 onwards the long-acting hyperbaric bupivacaine 0.5% was used giving the surgeon 3.5-4 hours time for the operation. In only 1 (0.1%) out of the 887 procedures where the spinal anesthesia had been induced by this agent morphine had to be given, and no operation had to be terminated prematurely.
Postspinal headache was a common complaint, but it did not last longer than 3-5 days.
There were no differences between lignocaine and bupivacaine with regard to blood pressure lowering, nausea or bradycardia.
Total spinal block, the most serious complication of spinal anesthesia, was not seen.
There was not a single anesthesia-related death, neither intraoperatively nor postoperatively.
Allergic drug reactions due to either lignocaine or bupivacaine were not encountered.

One patient complained of weakness of and pain in both legs following the operation. This lasted for about 6 months and she recovered completely without treatment.

equipment and costs of spinal anesthesia

The only equipment required for the spinal anesthesia were a blood pressure machine, spinal needles and 5-ml glass syringes.
The total cost of the spinal anesthesia, including equipment, drugs, gauze, needles, syringes, intravenous fluids etc., was less than fl 10.00 per operation.

DISCUSSION

Spinal anesthesia is simple, as only 2 (0.2%) out of the 1,108 operations had to be postponed due to unsuccessful spinal tab. A few days later these 2 were successful; so in no instance it was necessary to change to another type of anesthesia.

Spinal anesthesia is effective, though its duration with lignocaine 5% was a limiting factor using this drug. Having changed to bupivacaine 0.5% the duration was long enough, even in operations lasting 3.5 to 4 hours; only once in 887 operations it was necessary to give morphine intraoperatively.
Though the first instillation had been lege artis, a repeat injection of the drug had to be given 16 times (1.4%). This might have been due to the fact that the drugs were stored at inside temperatures of up to 40-45 C as no refrigerator was available in the hospital.

Spinal anesthesia with either lignocaine 5% or bupivacaine 0.5% is extremely safe, as no anesthesia-related intra- or postoperative death was seen and no allergic drug reactions were noted.

In only 26 (2.3%) out of the 1,108 operations intravenous fluids were given due to strict indications. These indications were based on the scarcity of intravenous fluids.
There was a definite drop in systolic blood pressure as monitored before anesthesia was given and 5 min, 10 min and 15 min after anesthesia had been given, but in only 6 (0.5%) out of 1,108 procedures intravenous fluids had to be given preoperatively. This might have been due to the fact that 1. no premedication was given and 2. the legs were placed straight on the operation table during the spinal anesthesia procedure. In the last 600 operations no intravenous fluids had to be given at all.

The blood pressure lowering effect should not be considered as a complication, but as a further advantage of spinal anesthesia, as it leads to less intraoperative blood loss and better spontaneous hemostasis.

That an intraoperative blood transfusion was never necessary in 1,110 procedures is probably due to the blood pressure lowering effect of the spinal anesthesia and the very strict indications for giving intravenous fluids. It must be said that anybody can loose a maximum of 500 ml of blood without acute major problems.

The incidence of postspinal headache might be reduced by using a thinner needle, for instance 25G; but these were not available.

Spinal anesthesia is cheap, as less than fl 10,00 was spent per operation on anesthesia, including equipment, materials, drugs etc.

Because of the simple technic, the effectiveness, the safety and the cost, spinal anesthesia with 4 ml bupivacaine 0.5% is the anesthesia of choice in developing countries for operations of the lower half of the body including VVF-surgery.

Chapter VI
indwelling bladder catheter in 100 VVF-patients

introduction

Spontaneous healing of a VVF is possible, but only before there is cross-union between the bladder mucosa and the anterior vaginal wall mucosa. This might be promoted by an indwelling bladder catheter for some time keeping the bladder completely relaxed and bringing the edges of the fistula together.
This thesis would not be complete without giving an impression of to what extent an indwelling bladder catheter might help.

materials

From August 1985 through October 1988, an indwelling bladder catheter was inserted into a selected number of 100 patients in order to promote spontaneous healing.
Not all the patients had a VVF, but some were completely incontinent and some had a urethra stricture with overflow.
In 97 patients the leaking of urine started following obstructed labor. In only 3 patients the cause was nonobstetric: overflow incontinence due to urethra stricture for 8 months following catheterization elsewhere because of urine retention/high fever/diarrhea in a 10-yr-old girl; total incontinence for 4 years following rape in a 12-yr-old girl; and spontaneous total incontinence for 10 days in a 14-yr-old girl.
Out of the 100 patients, 83 were leaking less than 3 months and 17 were leaking more than 3 months.
At first, only patients with a fistula size of 2 cm or less were treated this way, but later a catheter was inserted into almost any patients with a fresh VVF of no longer than 3-mth duration.

methods

A FOLEY catheter Ch 16 was inserted for 4-6 weeks, and the patient was instructed to drink as much as possible in order to produce a minimum of 4000 ml urine per 24 hr.
If there was a stricture, first a dilatation was performed and then the catheter was inserted.
The patient was instructed to report once a week about leaking through the vagina and/or catheter.

results

Fifty-nine patients healed completely, i.e. closed and continent, including the 3 nonobstetric patients.
Forty-one patients needed an operation; in 1 patient the fistula had healed, but she was incontinent.
In 9 patients the catheter had to be removed because the balloon was in the fistula opening at the bladder neck.

DISCUSSION

It is difficult to differentiate between a small VVF and urinary (stress) incontinence, even when gentian violet is being used, especially early after delivery. Also in some patients the VVF as noted at first examination had healed, but they were incontinent or had developed a urethra stricture.

Most of the patients in whom the balloon was in the fistula did not report about leakage through the vagina as the balloon was sealing off the bladder opening, unless the fistula was large.

No reliable statistical evaluation can be made in order to come to prognostic factors as it was a selected number of patients. Still in 59 patients the indwelling bladder catheter contributed to spontaneous healing; even some of the minute fistulae with a duration of more than 3 months healed.

Therefore, any patient with a fresh obstetric or surgical VVF of up to 3-mth duration should have an indwelling bladder catheter for 4-6 weeks.

Chapter VII
general discussion, conclusions and recommendations

Though the obstetric VVF has disappeared from the industrialized world, it is still very prevalent in developing countries. The number of VVF-patients is at least 500,000 in the world. As calculated from an obstructed labor rate of 5% and the fact that at least 200 million women of child-bearing age have no ready access to an organized obstetric unit, the annual incidence rate is estimated at a minimum of 100,000 patients.

Though the VVF is preventable, it will be prevalent in the developing countries for many years to come considering the limited resources. Therefore it will remain a major public health problem for the coming 50 years, and a challenge for future generations of surgeons.

As has been demonstrated in this thesis, under primitive conditions it is possible to close the fistula in 93.0% of the VVF-patients: with continence and complete resocialization of the patient in 85%; and with incontinence of the patient in 8%.

From a public health viewpoint, the following recommendations are made to have an impact upon an almost hopeless situation:

a. prevention

health education to the general public in developing countries by all means of information (radio, television, newspaper, poster, school, antenatal clinic etc.) that any woman who is in labor longer than 1 day should be brought as soon as possible to the nearest hospital where a cesarean section can be performed; however, unfortunately not too much can be expected from health education because of scarcity of transport and lack of health facilities in the rural areas

b. rehabilitation

multiple small low-cost VVF-units have to be set up within the existing health system of the developing countries, where with a minimum of equipment and materials the simple repairs can be performed; for the complicated fistulae the existing teaching hospitals can be used

c. training

indigenous doctors of the developing countries should be trained sothat they know which types of fistulae they can handle themselves and which types of fistulae they better refer to the teaching hospitals

d. financing

as the developing countries have limited resources, it has to be a joint venture between the respective governments, voluntary aid organizations and the governments of the industrialized countries in the form of bi- or multilateral agreements

e. world-wide attention

this is a task for the World Health Organization within their program for better maternal health

f. backlog of patients

a team of VVF-specialists should make an effort to deal with the thousands of patients waiting for years for a repair; this team also could be used for setting up a VVF-unit and then move to another unit, and for training

From a patient management viewpoint, the following recommendations are made:

Any patient with a fresh obstetric or surgical fistula of no longer than 3-mth duration should have an indwelling bladder catheter for 4-6 weeks; not only for promoting spontaneous healing, but also for psychologic reasons that something is being done.

If the patient needs surgery, a minimum interval of 8-12 weeks since the fistula development is necessary before a repair is performed depending upon the condition of the tissue.

Preoperative antibiotics should not be used routinely, only on strict indication, e.g. sepsis or pneumonia. If urine is freely draining/leaking through the fistula without obstruction, urinary tract infection is not seen.

For prognostic and surgical purposes, the following **classification of fistulae** is recommended:

I fistulae not involving the closing mechanism

IIaa fistulae involving the closing mechanism without urethra loss and without a circumferential defect

ab fistulae involving the closing mechanism without urethra loss and with a circumferential defect

ba fistulae involving the closing mechanism with urethra loss and without a circumferential defect

bb fistulae involving the closing mechanism with urethra loss and with a partial/total circumferential defect

III ureter fistulae and other exceptional fistulae

The prognosis as to closure and continence progressively worsens from group I through IIbb; for group III no data are available to me, as none has been encountered sofar. A circumferential defect should be specifically looked for, as it is common and worsens the prognosis; in roughly 50% of the fistulae involving the closing mechanism it was seen.

Except for a clinical assessment of the patient and of the fistula, radiologic investigation, cystoscopy or examination in anesthesia are not required as a routine; none has been performed in over 1,000 patients.
Following this assessment the surgeon should ask himself if he is able to perform the VVF-repair himself or refer the patient to a surgeon more experienced or wait until his own experience is sufficient. It looks so easy until the operation has started.
Spinal anesthesia with a long-acting drug, e.g. bupivacaine 0.5%, is highly recommended. No premedication should be given and the patient should be in the sitting position with her legs straight on the operation table in order to prevent excessive blood pressure lowering. If shock develops it is always within 5 min after instillation of the drug into the dural sac, and then intravenous fluids should be given. Strict indications should be used for giving intravenous fluids. Atropine should be given to patients above 50 years old to prevent severe bradycardia.
Speaking with the patient and clinical observation seems to be sufficient for intraoperative monitoring.
General anesthesia is complicated, risky and expensive, and well-trained personnel are needed.

A FOLEY catheter Ch 16 seems to be the catheter of choice, also for urethra reconstructions; perhaps a silastic whistle tip catheter is even better as it has no balloon and is less irritating. Suprapubic urine drainage should not be practiced, as it means further trauma to the bladder and the drainage is not from the lowest point in the bladder.

The vagina is the approach route of choice in VVF-surgery for group I-IIbb; only exceptionally and for group III the abdominal route should be chosen. Even the only abdominal repair in this series should have been a vaginal repair.

The indications for episiotomies should be liberal to obtain good accessibility of the operation field; at the end of the operation only the skin is closed for better healing and in order to take off any tension on the anterior vaginal wall repair.

An effort should be made to identify and catheterize the ureters in fistulae where they may be ligated or cut during operation. If they cannot be identified dissection should be as near to the anterior vaginal wall (as far away from the bladder wall) as possible.

The flap-splitting technic with wide mobilization of anterior vaginal wall and bladder is recommended in order to perform a completely tensionless closure of both.

In order to prevent cross-union of bladder mucosa with anterior vaginal wall mucosa, the bladder should be closed with inverting and the anterior vaginal wall with everting absorbable sutures; a one-layer closure of interrupted sutures is sufficient.

In all fistulae involving the closing mechanism the bulbocavernosus fat/muscle graft is recommended; for fistulae not involving the closing mechanism only closure of fistula is sufficient.
The bulbocavernosus fat/muscle graft a. brings a new blood supply to the operation area, b. covers and seals off the bladder repair, c. prevents cross-union between

bladder mucosa and anterior vaginal wall mucosa, d. fills up dead space, e. elevates the bladder neck/UV-junction/proximal urethra against the back of the symphysis and f. functions as a polster at sexual intercourse and at following deliveries.

In fistulae with a major loss of the anterior vaginal wall, this can be reconstructed by bilateral skin-mucosa advancement flaps from both labia.

Antibiotics and uroseptics should not be used postoperatively as a routine "prophylaxis". Far more important is to make sure the patient is drinking as much as possible in order to produce a minimum of 4000 ml urine per 24 hr to prevent a. blocking of the indwelling bladder catheter and b. urinary tract infection.

In case of failure a minimum interval of 8-12 weeks should be allowed before re-operation is undertaken. This re-operation should be performed according to the same principles as if it were the first repair.

As postoperative urinary (stress) incontinence is the major problem in VVF-surgery, the following recommendations are made:

a. prevention

if necessary the UV-junction should be reconstructed anatomically; this is not always possible

during operation an effort should be made to elevate the bladder neck/UV-junction/proximal urethra as high as possible against the back of the symphysis; even the high elevation obtained by suturing the bulbocavernosus fat/muscle onto the superior pubic bones does not seem to be sufficient; therefore at present the bulbocavernosus fat/muscle graft is fixed bilaterally onto the back of the abdominal musculature as a sling around the bladder neck/UV-junction/proximal urethra covering the whole urethra at the same time; if the bulbocavernosus fat/muscle graft is not long enough it is fixed onto the back of the abdominal musculature on the opposite side and onto the superior pubic bone at the same side; theoretically no higher elevation is possible; of course this is all done vaginally

b. correction of incontinence

rhaphy of bladder neck/UV-junction/proximal urethra for a better arrangement of the closing mechanism

lengthening/stretching urethroplasty to get a functional urethra of sufficient length

high elevation of bladder neck/UV-junction/proximal urethra for repositioning of the closing mechanism into a normal physiologic position; at present the anterior vaginal wall is fixed bilaterally through the endopelvic ligament onto the superior pubic bones; this gives an excellent elevation, is a minor procedure and does not interfere with urethra function; of course this is also done vaginally

I hope that the specific medical objectives of this thesis have been fulfilled, and it is my sincere wish that the general objectives will be reached as well in the near future.

Chapter VIII
summary; samenvatting

chapter I

The vesicovaginal fistula (VVF) is as old as mankind, has been a constant source of misery to the women affected and will be a major public health problem for many years to come in the developing countries. The VVF is rare in the industrialized world where surgery is the main cause, but is very common in the developing world where obstructed labor is the main cause. The prevalence has been estimated at a minimum of 500,000 VVF-patients in the world, which is not well-known. The VVF is not only a medical, but even more a social problem as most patients are outcasts in their own community because of the continuous dribbling of urine along their legs, the wetting of their clothes and the accompanying smell. Most of the time an operation is necessary, though spontaneous healing is possible.
A short chronologic review of the most important literature on surgical repair was given starting with Hendrick van ROONHUYSE in 1663.
This thesis has been based on a personal experience in the (surgical) management of 775 VVF-patients and in the anesthetic management of 1,110 VVF-repairs in Northern Nigeria.
As it is a sociomedical problem, general objectives and specific medical objectives were outlined.

chapter IIa, IIb, IIc

The first 500 consecutive VVF-patients were analyzed in order to obtain general baseline data for all 500 patients and further baseline data for the 470 obstetric VVF-patients.
The preoperative preparation, operation methods and postoperative management were described. The operation was performed vaginally, and the flap-splitting technic with or without a bulbocavernosus fat/muscle graft was used. A total of 620 operations were performed.
The fistula was closed in 465 patients (93.0%), with continence in 424 (84.8%) and with incontinence in 41 (8.2%); the fistula was not closed in 17 patients (3.4%); 14 patients (2.8%) died postoperatively; 2 patients (0.4%) absconded; and the result was questionable in 2 patients (0.4%). The primary and final results were analyzed according to the anatomic/functional location of the fistula. The outcome as to closure and to continence worsened progressively from group I, 156 fistulae not involving the closing mechanism, to group IIa, 288 fistulae involving the closing mechanism without urethra loss to group IIb, 56 fistulae involving the closing mechanism with urethra loss.
Postoperative urinary (stress) incontinence was the major problem in fistulae involving the closing mechanism.

chapter III

A technic was devised in order to elevate the bladder neck at VVF-repair by fixation of the bulbocavernosus fat/muscle graft bilaterally onto the superior pubic bones.
The relevant data were given of another group of 150 patients with fistulae involving the closing mechanism without urethra loss consecutively operated by this technic.
At first attempt the fistula could be closed in 128 patients (85.3%), with continence in 113 (75.3%) and with incontinence in 15 (10.0%); the fistula was not closed in 19 patients (12.7%); and 3 patients (2.0%) died postoperatively. The results were analyzed according to whether or not there was a circumferential loss at bladder neck/UV-junction/proximal urethra. The outcome as to closure and to continence was better in group IIaa, 76 patients without a circumferential defect, than in group IIab, 74 patients with a circumferential defect.
Also a technic for reconstruction of the anterior vaginal wall was described, performed in 38 patients and discussed.

chapter IV

A technic was described for reconstruction of the urethra. The relevant data were given for another group of 25 patients with fistulae involving the closing mechanism with urethra loss consecutively operated by this technic.
At first attempt the urethra reconstruction was successful in 19 patients, with continence in 15 and with incontinence in 4; the reconstruction was unsuccessful in 5 patients; and 1 patient died postoperatively. A statistical evaluation was not possible.

chapter V

Spinal anesthesia was used in 1,108, general anesthesia in 1 and no anesthesia in 1 out of the 1,110 VVF-repairs and related operations performed in a 5-year period.
The technic of the spinal anesthesia was described. In the beginning lignocaine 5% was given in 221 operations, but its short duration was a limiting factor. Therefore later bupivacaine 0.5% was given in 887 operations.
No anesthesia-related intra- or postoperative death occurred; intravenous fluids were given in 26 procedures (2.3%), immediately preoperatively in 6 (0.5%) and immediately postoperatively in 20 (1.8%); and no intraoperative blood transfusion was given.
The cost of the spinal anesthesia, including equipment, drugs, gauze etc., was less than fl 10.00 per operation.
It was stressed that spinal anesthesia with bupivacaine 0.5% is simple, effective, safe and cheap.

chapter VI

An indwelling bladder catheter was inserted for 4-6 weeks in a selected number of 100 VVF-patients in order to promote spontaneous healing. Fifty-nine patients healed completely, and in 41 an operation was necessary. A statistical evaluation was not possible. Insertion of a catheter into any patient with a fresh VVF was propagated.

chapter VII

Recommendations were made for the prevention of VVFs, and for setting up a VVF-service in developing countries in a joint venture between the respective governments, voluntary aid organizations and the governments of the industrialized countries by means of bi- or multilateral agreements.
Recommendations were made about the (surgical) management of the VVF; also a classification was proposed based upon prognostic factors and surgical technics.
Recommendations were made for the prevention and for the surgical treatment of postoperative urinary (stress) incontinence.

hoofdstuk I

De vesicovaginale fistel (VVF) is zo oud als de mensheid, is altijd een bron van ellende geweest voor de betreffende vrouwen en zal een groot public health probleem blijven in de ontwikkelingslanden voor vele jaren. De VVF is zeldzaam in de geindustrialiseerde wereld, waar chirurgie de voornaamste oorzaak is, maar is algemeen verbreid in de ontwikkelingswereld, waar obstetrische komplikaties de voornaamste oorzaak zijn. De prevalentie wordt geschat op tenminste 500.000 VVF-vrouwen in de wereld, hetgeen niet bekend is. De VVF is niet alleen een medisch, maar veel meer een sociaal probleem, daar de meeste patienten uitgestoten worden uit hun eigen maatschappij, omdat ze urine lekken, hun kleren nat maken en onaangenaam ruiken. Spontane genezing is mogelijk, maar meestal is een operatie noodzakelijk.
Een kort chronologisch overzicht werd gegeven van de belangrijkste literatuur op het gebied van de operatieve behandeling te beginnen met Hendrick van ROONHUYSE in 1663.
Dit proefschrift is gebaseerd op de persoonlijke ervaring opgedaan in de (chrirurgische) behandeling van 775 VVF-patienten en in de anesthesie in 1.110 VVF-operaties in Noord Nigeria.
Omdat het een gekombineerd medisch-sociaal probleem is, werden algemene en specifiek medische doelstellingen opgesteld.

hoofdstuk IIa, IIb, IIc

De gegevens van de eerste 500 opeenvolgende VVF-patienten werden geanalyseerd ter verkrijging van baseline data voor alle 500 patienten samen met verdere baseline data voor de 470 obstetrische VVF-patienten.
De preoperatieve voorbereiding, operatie-methoden en postoperatieve behandeling werden beschreven. De operaties werden vaginaal verricht en de flap-splitting techniek met of zonder een gesteelde bulbocavernosus vet-spier lap werd gebruikt. In totaal werden 620 operaties verricht.
De fistel was gesloten bij 465 patienten (93.0%), met kontinentie bij 424 (84.8%) en met inkontinentie bij 41 (8.2%); de fistel was niet gesloten bij 17 patienten (3.4%); 14

patienten (2.8%) overleden na de operatie; 2 patienten (0.4%) onttrokken zich aan de postoperatieve behandeling; en in 2 patienten (0.4%) kon het resultaat niet beoordeeld worden. De primaire en eind resultaten werden geanalyseerd met betrekking tot de anatomische en funktionele plaats van de fistel. De resultaten betreffende zowel sluiting als kontinentie waren progressief slechter van goep I, 156 fistels zonder beschadiging van het sluitmechanisme, tot groep IIa, 288 fistels met beschadiging van het sluitmechanisme zonder urethra verlies, tot groep IIb, 56 fistels met beschadiging van het sluitmechanisme met urethra verlies.
Postoperatieve urine (stress) inkontinentie was het grootste probleem in de fistels met beschadiging van het sluitmechanisme.

hoodstuk III

Een techniek werd beschreven om bij VVF-operatie tegelijkertijd de blaashals omhoog te brengen door de bulbocavernosus vet-spier lap beiderzijds vast te hechten aan het os pubis superior.
De relevante data werden gegeven van een andere groep van 150 patienten met een fistel met beschadiging van het sluitmechanisme zonder urethra verlies, die opeenvolgend geopereerd werden door middel van deze techniek.
Na de eerste operatie was de fistel gesloten bij 128 patienten (85.3%), met kontinentie bij 113 (75.3%) en met inkontinentie bij 15 (10.0%); de fistel was niet gesloten bij 19 patienten (12.7%); en 3 patienten (2.0%) overleden na operatie. De resultaten waren beter in groep IIaa, 76 patienten zonder circulair defekt van de blaashals/UV-overgang/proximale urethra, dan in groep IIab, 74 patienten met een circulair defekt van deze strukturen.
Ook werd een techniek beschreven, toegepast in 38 patienten en besproken om de vagina voorwand te rekonstrueren.

hoodstuk IV

Een techniek, ook met gebruik van de bulbocavernosus lap, werd beschreven om de urethra te rekonstrueren.
De relevante data werden gegeven voor een andere groep van 25 patienten met een fistel met beschadiging van het sluitmechanisme met urethra verlies.
Na de eerste operatie was de urethra rekonstruktie geslaagd bij 19 patienten, met kontinentie bij 15 en met inkontinentie bij 4; niet geslaagd bij 5 patienten; en 1 patient overleed na operatie. Een statistische bewerking was niet mogelijk.

hoofdstuk V

In de 1.110 VVF-operaties, uitgevoerd in een 5 jaar periode, werd spinaal-anesthesie gebruikt in 1.108, algemene anesthesie in 1 en in 1 was anesthesie niet noodzakelijk.
De gebruikte techniek van de spinaal-anesthesie werd beschreven. In het begin werd lignocaine 5% gebruikt in 221 operaties, maar de korte werkingsduur was een belemmerende faktor. Daarom werd later bupivacaine 0.5% gebruikt in 887 operaties.
Geen enkele patient overleed tijdens of na de operatie ten gevolge van de anesthesie;

intraveneuze vloeistoffen werden gegeven in 26 verrichtingen (2.3%), onmiddellijk preoperatief in 6 (0.5%) en onmiddellijk postoperatief in 20 (1.8%); en intraoperatief werd geen bloedtransfusie toegediend.
De kosten van de spinaal-anesthesie bedroegen nog geen fl 10,00 per operatie, inklusief equipment, geneesmiddelen, gaas etc.
De konklusie was, dat spinaal-anesthesie met bupivacaine 0.5% is eenvoudig, effektief, veilig en goedkoop.

hoofdstuk VI

In een geselekteerde groep van 100 VVF-patienten werd een FOLEY catheter in de blaas ingebracht voor 4-6 weken om spontane genezing van de fistel te bevorderen. Bij 59 patienten genas de fistel geheel en bij 41 was een operatie noodzakelijk. Een statistische bewerking was niet mogelijk. Aanbevolen werd om een blaas catheter in te brengen in iedere VVF-patient met een fistel van korte duur.

hoodstuk VII

Aanbevelingen werden gedaan ter preventie van de VVF en om een VVF-service op te zetten in een gekombineerde aanpak tussen de regeringen van de ontwikkelingslanden, de partikuliere hulporganisaties en de regeringen van de geindustrialiseerde landen door middel van bi- of multilaterale overeenkomsten.
Aanbevelingen werden gedaan betreffende een (chirurgische) behandeling van de VVF; een klassifikatie werd voor gesteld, gebaseerd op prognostische faktoren en op chirurgische technieken.
Aanbevelingen werden gedaan ter preventie en voor de chirurgische behandeling van postoperatieve urine (stress) inkontinentie.

Chapter IX
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curriculum vitae

Kees WAALDIJK

born on the 13th of September 1941 in Amsterdam-Duivendrecht

certificates:

gymnasium b	Gereformeerd Gymnasium in Amsterdam	1959
physician	Vrije Universiteit in Amsterdam	1969
ECFMG	American Embassy in Den Haag	1970
surgeon	Aerztekammer in Dusseldorf, West Germany	1981

further training:

gynecology/obstetrics	in Amsterdam/Nijmegen	1971/72/75
tropical medicine	KIT in Amsterdam	1971
leprosy	ALERT in Addis Ababa, Ethiopia	1972/83

work:

proofreader/editor	EXCERPTA MEDICA in Amsterdam 1960-72
army doctor	1969-70
resident in surgery/gynecology/obstetrics St Lukas Ziekenhuis in Amsterdam	1971-72
medical officer/leprosy-tuberculosis doctor District Hospital in Msambweni, Kenya	1972-75
resident in gynecology/obstetrics St Radboud Ziekenhuis in Nijmegen	1975
resident in surgery Wilhelm Anton Hospital in Goch, West Germany	1975-76
oberarzt in surgery in Kevelaer, Rees and Goch, West Germany	1976-83
war surgery/primary health care Kampuchean Refugee Camp in Khao I Dang, Thailand	1979/80
reconstructive surgery/leprosy Babbar Ruga Hospital in Katsina, Nigeria	1983-now

stellingen

I. VVF-patients are even more outcasts than leprosy patients

II. The vagina is the route of choice in VVF-surgery

III. Postoperative urinary (stress) incontinence is the biggest problem in VVF-surgery for which no final solution has yet been found

IV. Antibiotics and uroseptics should not be used as a routine prophylaxis in VVF-surgery

V. Spinal anesthesia with the long-acting agent hyperbaric bupivacaine 0.5% is simple, effective, safe and cheap

VI. Not giving a premedication and keeping the legs horizontally seem to prevent the occurrence of shock as a complication of spinal anesthesia

VII. Simple solutions are the best, only how to find them

VIII. Proper management is the key to any public health program, and especially in leprosy control

IX. We shall end the struggle against leprosy the same way as we started, viz. with individual patient care

X. Those who did not eat at least 10 kg of sand cannot say anything sensible about leprosy control in Northern Nigeria; the same applies to those who did not drive 100,000 km in the field

XI. Developing aid: the many poor in the rich countries help the few rich in the poor countries

XII. Most aid organizations are more interested in the organization of the aid than in the aid itself

XIII. Sophisticated high-tech medical equipment has no place in developing countries; it only proves that the (health) problems are not understood and gives the false impression/ feeling that something is being done

XIV. Life is suffering, but some do suffer more than others