BLADDER CATHETERIZATION WITHOUT DIRECT CONTACT WITH THE URETHRAL CANAL.

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The frequency of infections of the urinary tract and the high incidence of asymptomatic pyelonephritis in the general population have been stressed by various authors.[1-3]

Studies have shown that there is always some danger of introducing infection into the urinary bladder with catheterization.[2,4,5] Nevertheless, if quantitative bacterial counts are performed on properly collected, clean-voided specimens of urine, a diagnosis, including that of inapparent infection, can be made without the risk of introducing bacteria into the bladder.[2,3,6-10]

In the present series of sterile bladder catheterization without direct contact with the urethral canal, investigations have been carried out in an attempt to assess the value of this procedure.

MATERIALS AND METHOD

The series consisted of 51 unselected gynaecological patients at the King Edward VIII Hospital, Durban. Of these, 49 had undergone minor vaginal surgery for various conditions, such as dilatation and curettage and cauterization of the cervix, evacuation of products of conception after incomplete abortion, etc. The other 2 patients had undergone no operative procedure, 1 being a case of threatened abortion and 1 having being sent back from the theatre before the performance of a diagnostic dilatation and curettage because of a watery defaecation. Most of the patients had undergone one or more deliveries. In most of the cases there was a history of previous urinary infection. Urinary symptoms (burning or frequency) were present in 11 out of 30 of the cases; 16 patients were on penicillin, penicillin *plus* streptomycin, penicillin *plus* sulphatriad, or sulphatriad alone.

At all the operations for catheterization, the vulva and vagina were swabbed with a solution of cetavlon, followed by a solution of acriflavin in water. The labia minora were separated with one hand and the external urethral opening swabbed again, in one stroke, with acriflavin solution and immediately dried, usually with another stroke of a sterile gauze. Then a throat swab was inserted at least 1 cm. into the urethra and rolled slightly. From these swabs cultures were taken, and also smears for examination, direct and Gram stained.

A straight chromium-plated tube corresponding to a size-18 Foley catheter was inserted into the bladder, after which the bladder was emptied by passing a whistle-tip rubber catheter through the metal catheter. Suprapubic pressure was often applied, because the patients had urinated not long before the operation. Spilling not infrequently took place between the two catheters, especially when thin rubber catheters were used, and care was taken that only the urine from the rubber catheters was collected. The urine was investigated by examination of the centrifuged deposit (unstained and Gram stained) and by culture.

After the specimen of urine had been collected, the tip of the rubber catheter was stroked as thoroughly as possible on solidified blood-agar and McConkey culture media in Petri dishes. The metal catheter which thus served as a sheath was then removed and its tip cultured in the same way.

All specimens were kept at room temperature and they were usually taken to the laboratory for microscopic and culture examinations within 1 - 2 hours.

On 2 occasions it was necessary to dilate the urethra on account of the size of the metal catheter.

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LABORATORY FINDINGS

Urethral Swabs

On direct examination of the smears from the urethral swabs, pus cells, scanty to moderate in number, were present in 3 of the 51 cases. In these 3, no organisms were seen and the cultures from the swabs were negative. Of the corresponding 3 urinary specimens scanty pus cells were found in 2, with no growth on culture; and numerous pus cells plus trichomonas in the 3rd, with no growth. No cultures were obtained from the metal and rubber catheter tips in these 3 cases.

On Gram staining the smears from the urethral swabs Gram-positive bacilli in moderate numbers, including Döderlein bacilli, were present in 1 case, and no growth was obtained from the swab. Altogether, Döderlein bacilli were seen in the smears from the swabs in 5 cases. In these 5 cases no pus cells were observed in the swabs and the swab cultures were negative.

A moderate growth of *B. coli* was present in culture from the urethral swabs in 1 case, from which also no leucocytes or organisms were observed on examination of the unstained and Gram-stained smears. In this case, which was that of a pregnant patient who did not come to operation, *B. coli* were also found in the cultures from the urine and from both catheters, and moderate amounts of *Trichomonas vaginalis* and Gram-negative bacilli were seen on direct examination of the urine.

Urine

On microscopical examination of the centrifugal deposits from the urine specimens the following results were obtained:

Red blood cells were present in the specimens from 20 of the 51 cases, and of these 20 they were in moderate quantity in 9 and numerous in 5. There was no correlation between red blood cells and pus cells from the same specimen. Red blood cells *plus* pus cells in different amounts were present in 11 specimens.

In 3 specimens containing red blood cells (scanty in 2 and numerous in 1) trichomonas was also present.

Leucocytes were present in 29 of the urine specimens—numerous in 5 and in moderate numbers in 3.

Schistosoma haematobium was present in 1 specimen, associated with scanty pus cells and a moderate number of red blood cells.

Trichomonas vaginalis was present in 8 specimens. In 4 this was associated with 10 or more pus cells per high-power field, in 2 with 5 or more pus cells per field, and in 2 with no pus cells but varying numbers of red blood cells.

Gram-negative bacilli were present in 6 specimens. In 3 of these, all containing pus cells, and 2 also containing trichomonas, the bacilli were scanty. In the other 3 specimens the bacilli were present in moderate numbers; 2 of them contained numerous pus cells and trichomonas and gave on culture a growth of *B. coli* (scanty in one and moderate in the other); the 3rd contained scanty pus cells and a moderate number of red blood cells, and gave no growth on culture.

These growths of *B. coli* were the only growths obtained from the urine on culture. As stated, they were from 2 specimens, which were both associated with trichomonas, numerous pus cells, and Gram-negative bacilli in moderate numbers.

Catheters

The tips of the rubber catheter gave on culture a scanty growth of *B. coli* in 1 case and a moderate growth of *B. coli* in another. Both of these specimens were associated with corresponding *B. coli* culture in the urine.

From the case in which a moderate growth of *B. coli* was obtained from the rubber catheter, the metal catheter also gave a moderate growth of *B. coli.* In the other case in which a growth of *B. coli* (scanty) was obtained from the rubber catheter, the metal catheter gave no growth. In one other case, in which no growth was obtained from the rubber catheter, the metal catheter gave a very scanty growth of *B. coli*; in this case no growth of *B. coli* was obtained from any other specimen from the patient, and the growth from the metal catheter was thought to be due to contamination.

B. coli Cultures

In the following Table the other findings are shown in the 4 cases in which a growth of *B. coli* was obtained on culture:

Urethral Swab		*Urine*					*Rubber Cath.*	*Metal Cath.*
Dir.	*Cult. B. coli*	*RBC*	*Trich. vag.*	*Pus*	*Gram Org.*	*Cult. B. coli*	*Cult. B. coli*	*Cult. B. coli*
—	+	—	+	+++	+	+	+	+
—	—	—	+	+++	+	± f	± f	—
—	—	—	—	—	—	—	—	±
—	—	—	—	±	—	± f	—	—

Nil —. Scanty ±. Moderate + (5 - 9 per H.P. field). Marked +++. Coliform bacilli f.

DISCUSSION AND CONCLUSION

The non-pathogenic Döderlein bacillus was present in 5 of the urethral swabs. The urine and catheter-tip specimens from these 5 patients were negative. They were given no antimicrobial treatment.

In one of the cases in the series (a pregnant primipara, grav. 2) a moderate growth of *B. coli* was obtained from all 4 specimens (urethral swab, urine, and catheter tips). She was a case of pyuria and *Trichomonas vaginalis* infestation of the bladder. She had received no treatment before the investigation, and she did not come to operation.

Pyuria was present in 8 patients, in 6 of which it was associated with *Trichomonas vaginalis* infestation of the bladder; in 2 of the 6, cultures of *B. coli* were obtained. The 2 cases of pyuria not associated with *Trichomonas vaginalis* were cases of septic incomplete abortion and pelvic infection. Both were on penicillin and sulphatriad.

Trichomona vaginalis was present in 8 of the urinary specimens, of which 1 contained numerous red blood cells, 2 scanty red blood cells, and 5 none at all. The association of pyuria and trichomonas was noticeable.

The culture experiments with the tips of the 2 catheters used in the sterile bladder catheterization showed no advantage to be obtained by passing an inner catheter through another catheter as a shield to prevent contact of the inner catheter with the urethra. The one instance in which a very scanty growth of *B. coli* was obtained on culture from the metal tip, without any abnormal findings in the other 3 specimens, was thought to be most probably due to contamination.

SUMMARY

An investigation into bladder catheterization without direct contact with the urethral canal was made on 51 unselected gynaecological patients at the King Edward VIII Hospital.

Urethral swabs were taken, after which the urine was withdrawn by means of a rubber catheter passed through a metal catheter already inserted into the urethra, so as to prevent contact of the rubber catheter with the urethra.

Bacteriological investigations were carried out on the urethral swabs, the urine specimens, and the tips of both the metal and rubber catheters.

No advantage in sterile bladder catheterization by thus preventing the catheter from coming into contact with the urethra could be found in this small series of cases.

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