The Urological Aspects of Bilharziasis in Rhodesia

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PART II

Effects on the Ureter

When dealing with the pathological changes in the bladder the effects on the ureter should always be remembered, for much of the prognosis in urinary bilharziasis depends on whether there is serious damage to the ureter. The changes in the ureter may be secondary to primary bladder involvement causing ureteric dilatation, or to disease of the ureteric wall itself.

The primary bladder involvement may take the form of either submucous fibrosis causing stenosis of the ureteric orifice, with dilatation above, or bladder wall fibrosis with decreased bladder capacity and increased intravesical pressure, as previously described, causing secondary ureteric dilatation (Figs. 5 and 6).

Primary disease of the ureteral wall is also found in which fibrosis of lesser or greater degree invades and replaces the muscle bundles. The fibrosis may be followed by dilatation or stenosis or both. In many cases we meet varying combinations of primary bladder and primary ureteric disease.

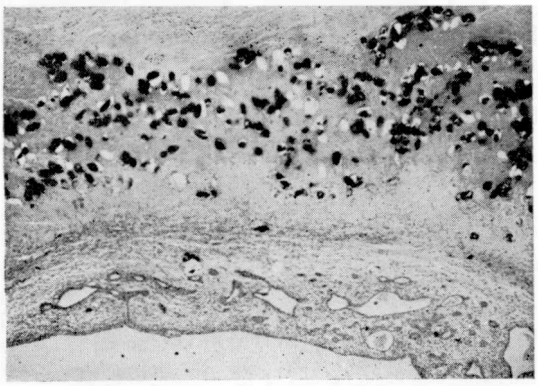


Fig. 7—Section of ureteric wall showing heavy deposition of ova in muscular layer.

When the ureter is severely affected by fibrosis one may expect to see fairly extensive involvement of the bladder submucosa at the same time, and it is rare to meet a case of ureteric disease with the bladder escaping entirely. We have seen one doubtful case and Sayegh reports its occurrence.

The ova are found mostly in the submucous layer, but collections of ova may be found extending well into the muscular layers and as far

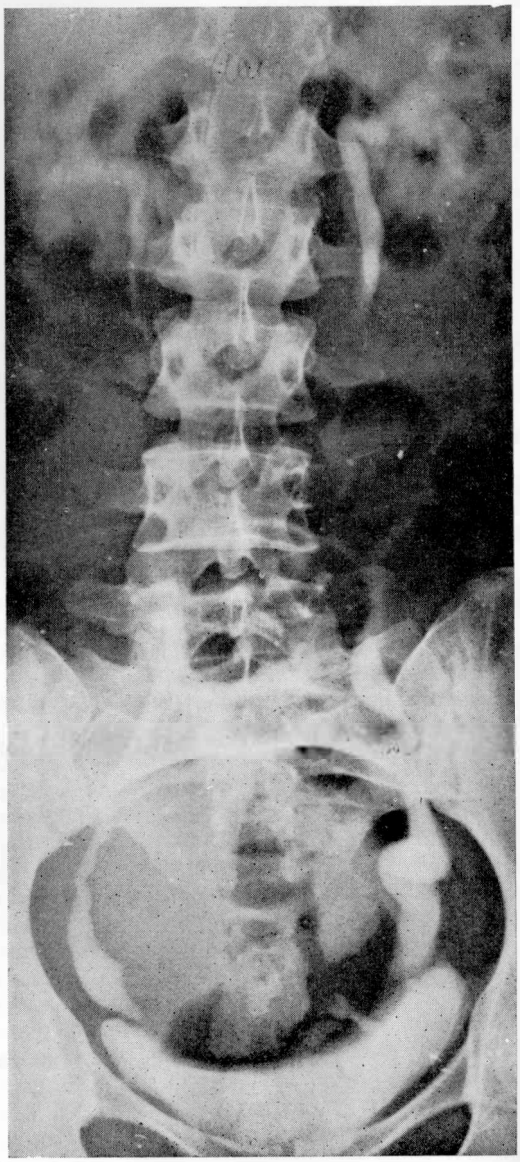


Fig. 8—African aged 28. Showing dilatation of lower ureters from bilharzial involvement of ureteric wall. No evidence of ureteric stenosis.

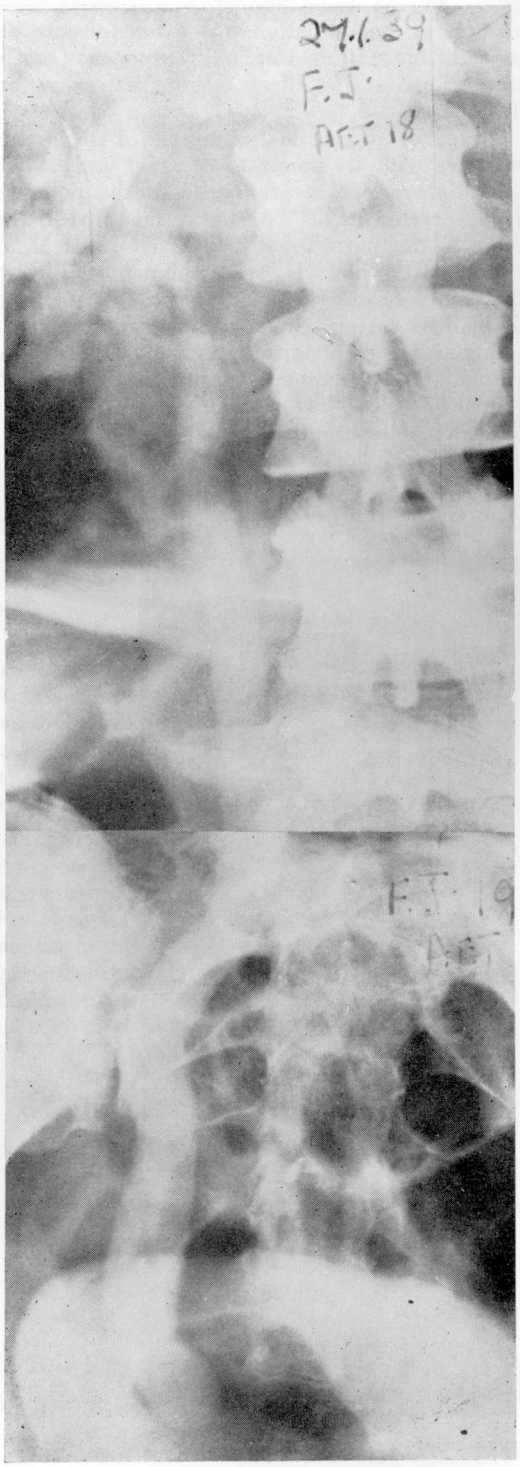
as the serous coat (Fig. 7). The diseased part of the ureter may be so thickened and enlarged that the ureter can be felt with ease at operation or autopsy. At autopsy one sees the same lesions in the ureter as are described in the bladder, namely, tubercles, sandy patches, cysts and fibrosis, but fibrosis is the lesion *par excellence*.

The degree of ovideposition is usually greatest in the lower third of the ureter and it is here that most of the pathological changes are met. This is probably due to the extensive anastomosis which exists between the mesenteric veins and those around the bladder base, prostate and the lower two to three inches of the ureter. A second but less common site for ureteric disease is opposite the third or fourth lumbar vertebra, and Makar (1948) explains this as being due to an anastomosis between the superior mesenteric vein and the ureteric veins on the right and the inferior mesenteric veins and the ureteric veins on the left, the anastomosis on the left being more extensive and marked than on the right. In the six patients in our series with stricture in this situation, three had disease on the right side; they were all Europeans; while three showing the effect on the left were all Africans.

The early fibrosis in the muscle of the ureter interferes with its power to contract and causes it to dilate under the influence of the pressure of the secreted urine. As the distal third of the ureter is the most usually involved segment, it is this part which is most commonly dilated. The ability of this segment to expel urine into the bladder is impaired, with the result that it is unable to empty itself as in health. The early dilatation frequently occurs in the absence of stenosis below. This effect is well illustrated on intravenous urography (Figs. 8 and 9).

The fibrosis may involve the whole ureter. When gross, it replaces most of the muscle in the ureteric wall, so leading to distortion and

Fig. 9—African aged 22. Intravenous pyelogram showing persistent filling of both ureters with early dilatation. No evidence of ureteric stenosis. Bladder capacity, 550 ml.



dilatation of the distal third, or at times of the whole ureter. This dilatation is not infrequently exaggerated because of ureteric stenosis or small capacity bladder below. It must be remembered, however, that this dilatation may follow the destruction of the muscle in the wall of the ureter in the absence of stenosis or small capacity bladder, the damaged ureteric wall dilating under the secretory pressure of the urine (Gelfand, 1948; Gelfand and Honey, 1953).

The fibrosis may result in narrowing of the intravesical portion of the ureter by involvement of the intravesical ureteric wall. Obstruction then ensues, giving rise to the same effects as follow any other type of obstruction. The ureter above hypertrophies and dilates and the pelves and calices may follow suit (Fig. 10). If the ureteric wall itself is not diseased the dilatation is regular and tends to disappear after relief of the stenosis. If the ureteric wall itself is invaded by bilharzial fibrosis, the dilatation tends to be greater and irregular and does not decrease after relief of the obstruction.

If hydronephrosis has been caused by the obstruction, relief of this results in an improvement in the degree of the dilatation of the renal pelvis and calices.

Calculi

Calculi are surprisingly rare. In the European we find calculi no more frequently in those suffering from bilharziasis than in those free of it. The European, who is much less frequently infested with bilharziasis, forms calculi far more frequently than the African. We have met occasional calculi in the ureter, pelvis and bladder of Africans suffering from advanced bilharziasis and it is impossible to say what part bilharziasis played in their formation. On the other hand, soft phosphatic calculi are not uncommonly found in the dilated pelvis above a heavily infected bladder in the absence of bilharziasis, when the urine is strongly alkaline.

Infection

Although the bladder mucosa is thickened, acute secondary infection in a bilharzial bladder is not seen in the European and in the African is uncommon. This surprised us, as we had been led to believe from the literature that the bilharzial bladder is frequently affected by

Fig. 10—European female aged 18. Intravenous pyelogram showing hydronephrosis and dilatation of whole ureter above stricture of intravesical ureter. Treated successfully by cystoscopic meatotomy.

secondary invading organisms. Bilharziasis is similar in this respect to tuberculosis and syphilis, in which acute secondary infecting processes rarely develop. On the other hand, we find that in the more severe chronic types of bilharzial cystitis organisms are frequently cultured and leucocytes are seen in fairly large numbers. It would seem that the presence of these organisms indicates a secondary infection which appears to excite no more than a mild chronic cystitis. Infection is also uncommon in dilated ureters and hydronephroses, whether they occur alone or in association with stricture of the ureter.

Age

Bilharziasis is usually a disease of young people and this constitutes one of the tragedies of the disease.

In the African the disease is first contracted in early childhood. Though we saw no late cases in children under 10, over 20 per cent. of our African cases were in the second decade when some of the most grossly calcified bladders were encountered.

Table I

Age Incidence in Series of Advanced Cases

Age	African	European
Below 10	—	5
Second decade	20	73
Third Decade	51	109
Fourth decade	22	77
Above	7	36
	100	300

In Europeans the age incidence was materially the same, although the disease was not so extensive; 1.6 per cent. of our late cases were in children under 10—all five being nine years old. One of them had bilateral ureteric strictures requiring open ureteric meatotomy.

Sex

Although it is not surprising that the European male is affected four times as frequently as the female (244 males and 56 females), as he has greater freedom of access to the rivers, we were surprised to find advanced disease 49 times more frequently in the African male than in the female (98 males, two females), but this difference may be partly accounted for by the greater numbers of males who live in the urban areas and therefore seek treatment at our hospital.

Carcinoma

The relationship of bilharziasis to cancer of the bladder is a difficult problem and one on which investigation is being pursued. Carcinoma of the bladder is not uncommonly encountered in the African; indeed, it is the commonest form of malignant disease seen in hospital practice amongst people of that race.

In our European practice we have not yet met a case of carcinoma arising in a bilharzial bladder. In the African, however, it is usually associated with bilharziasis, but as more than 80 per cent. of Africans are infested with the disease it could be argued that the two are coincidental. Many of the Africans who develop carcinoma of the bladder are in a younger age group than is customary with the European. This supports a bilharzial background, as does the fact that the proportion of squamous celled carcinomata in the bladder is much higher in the African than in the European.

(*To be continued*)