Discussion

From an examination of Table IV it will be seen that there is no very startling difference between the non-penicillin- and the penicillin-treated series, but in general the comparison bears out the impression that penicillin shortens the disability, more especially if given systemically, though such a comparison between different papers is not very satisfactory.

Various papers read at the XXIIIrd Medico-Legal Congress in Paris (1946), for cases treated before the general use of penicillin, gave similar periods of disability, such as that of paronychia (13 days' treatment). It was also shown that with advancing age there was increased temporary and permanent incapacity, and that the longer the time before surgical treatment the longer was the period of temporary incapacity; this conclusion applied to infected hands in general and agreed with the results of terminal-pulp infection noted in this paper. However, Bolton *et al.* (1947) found no relation between length of history and disability, but reported increased disability with increased age.

Though the mean period of disability may show only slight diminution with penicillin treatment, it is interesting to see that Curr (1945) and the Medico-Legal Congress report spreading and gangrenous infections. It is in avoidance of these severe infections that systemic penicillin shows the most beneficial results. To prove that such infections are prevented by routine systemic penicillin would need very large numbers of cases. I have, however, seen infection extend along the finger in cases treated by apparently adequate incision but without penicillin, and especially in old and debilitated subjects. These infections have been easily controlled with penicillin in out-patients. The incidence of complications such as osteomyelitis, arthritis, and tenosynovitis is also decreased.

With practice it may be possible to select at first sight all cases that are complicated or appear likely to spread and become complicated, but unless this can be relied upon routine administration of penicillin should be carried out.

Various authors have mentioned conservative treatment, and Webster (1947) concluded that it was impossible to abort a terminal-pulp infection. Experience gained in this series, however, suggests that when the cases are first seen an attempt should be made to decide whether pus is present or not. If present, incision is indicated; if not present, systemic penicillin and local heat may abort or localize the infection. The common practice of applying heat until a finger is "ripe" must be condemned, as once pus has formed delay may result in further destruction of pulp tissues, and if pus has not formed resolution is possible with penicillin. In hospital practice few cases are seen early enough to abort, but in outside practice a larger number of suitable cases should be available.

The method is not advised without full surgical facilities and daily review of cases, for, while pain is often greatly relieved by one or two injections of penicillin, incision may still be necessary.

Summary and Conclusions

Systemic penicillin, 200,000 units in one daily dose, was given as a routine to cases of infected hands in an out-patient department. The results of 380 cases are analysed and compared with those of cases not so treated and with other published results.

This routine did not reduce the period of disability in a marked degree in uncomplicated cases, though there was some definite improvement.

It resulted in the resolution of some early cases without incision and did not increase the disability in cases which had been treated conservatively and which were subsequently incised.

It controlled systemic reaction and spread in severe uncomplicated cases.

It reduced the period of disability and probably the incidence of complicated cases.

It greatly improved the functional end-result in cases of arthritis and tenosynovitis.

It resulted in a considerable saving of in-patient beds, admission of infected hands being reduced by 52% in spite of a much larger out-patient clinic.

It was found in the case of terminal-pulp infection that with increasing age there was a longer history of pain, a longer period of disability, and a greater liability to osteomyelitis.

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CHRONIC URETHRAL OBSTRUCTION IN CHILDREN

BY

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Chronic obstruction of the urethra is so much more common in the adult than in the child that, except in very specialized urological practice, experience of the latter is usually very limited. The outlook of the general surgeon is thus inevitably coloured by his experience of adult pathology. Where long-continued obstruction exists in the adult, with production of advanced hydronephrosis, relief of the obstruction can usually do little more than arrest the hydronephrosis. In the child, however, reparative powers are so much more active that a very different picture presents itself. A gross hydronephrosis can recover to such an extent that subsequent pyelography will reveal no abnormality whatever. Furthermore, after as much as two years of overflow incontinence the bladder sphincters can regain their tone and preserve continence instantaneously, as was demonstrated in the majority of the 73 cases which form the basis of this article.

All the patients were Abyssinian boys aged from 8 to 16 who had suffered amputation of penis, scrotum, and testes several years previously, the result of intertribal raids and minor warfare. The boys almost invariably showed other evidence of the attacks they had withstood from their aggressors. Depressed scars of the scalp, missing fingers, and deep scars of the forearms were frequent. The mutilation is carried out by grasping the external genitalia, pulling out the mass of tissue, and slashing it through with the angled sword with which many of the Abyssinians are armed. One would expect that the immediate mortality from such injuries would be high, and this impression was confirmed by the accounts of native witnesses. Gross infection of the raw surface occurs, and this accounts for the extreme degree of scarring, which led ultimately to chronic urethral obstruction in the cases under review.

Amputation of penis and scrotum is a rare condition. In most industrial accidents of this nature the skin of the penis and sometimes of the scrotum is avulsed, but the penis itself is usually intact. Owens (1942), in an exhaustive review of the literature, found only 34 cases of denudation, in only 13 of which was the skin of the scrotum also destroyed. Delprat (1944) and Lyons (1945) each reported a case of traumatic avulsion of the penis; in the latter's case the scrotum was also lost. Each claimed that his case was unique in the literature. Rodrigues (1946) reports a case of amputation, but devotes his article almost exclusively to the forensic aspect. Gillies (1948) records three cases of penile loss—two traumatic and one the result of phagedaena—and McIndoe (1948) reports two further cases of traumatic amputation.

First Cases

In June, 1942, at Addis Ababa, two boys, aged 8 and 14, from the Empress Menin School for Orphans were sent by the school medical officer for advice and treatment for urinary incontinence, with the suggestion that there was "something wrong with the bladder sphincter." Each boy presented a similar picture. Mutilation had taken place some seven years previously, and each had been incontinent for about two years. There was complete absence of external genitalia, the former site of which was occupied by a projecting irregular mass of dense scar tissue. From a minute depressed orifice in the scar tissue a small but constant stream of urine trickled down one or other leg. In each case a tense firm bladder reached the umbilicus.

It was apparent that the boys suffered from overflow incontinence resulting from urethral stricture. It was impossible to introduce even the finest lacrimal probe into the opening in the scar tissue. A thread of fine silkworm-gut was used as a probe, and by a combination of rotary and to-and-fro movements it was with difficulty introduced through the stricture into the urethra. On its withdrawal no increased flow of urine resulted. Urine collected in a test-tube placed over the orifice showed no abnormality. "Perabrodil" intravenous pyelography was done. Superimposed circular shadows of three calices, each the size of a walnut on the film, testified to the presence of very advanced bilateral hydronephrosis in both cases. Excretion of the perabrodil was efficient; no other test of renal efficiency could be carried out under the conditions at that time existing in Addis Ababa.

Operation.—In the elder of the two boys the whole mass of scar tissue was removed under spinal analgesia. It was of the consistency of hard rubber, oval in shape, 4 by 2 in. (10 by 5 cm.) in extent, and over 1 in. (2.5 cm.) thick. It was difficult to identify normal urethral mucosa beneath the scar. A silkworm-gut thread introduced through the stricture was of great help in finding the urethra. The bladder emptied spontaneously in the act of transecting the urethra. The stump of penile urethra measured about 1 in. in length. It was split inferiorly, and a mucocutaneous continuous suture of fine catgut was introduced with an atraumatic needle. There was no tension on either skin or urethral mucosa. An indwelling catheter was left in position for four days. The boy was continent after the catheter was removed.

In the younger of the two boys precisely similar conditions obtained. In each case an irregular spiral fistulous track was found coursing through the scar tissue. There was no dilatation of the urethra between the triangular ligament and the scar.

Further Cases

The Empress of Ethiopia supports a school for orphans in Addis Ababa. Many of the boys there were in the same condition. From this source and from local doctors who sent me patients I saw 73 such cases before leaving Abyssinia in December, 1944. The ages of the boys varied from 8 to 16, and in all cases amputation had been done six to seven years before. Incontinence had been present for periods varying between a few months and two years or more. In most of the cases incontinence had begun about five years after the mutilation.

It is impossible to estimate the proportion of cases in which ultimate urinary incontinence results. The 73 cases here summarized were all seen because of overflow incontinence. It is certain that some cases never develop obstruction, for in several adults in whom the condition was seen casually the mutilation had taken place several decades previously and, in spite of complete lack of medical care at the time, there had never been any difficulty in micturition. Reports of such cases are rare in the literature.

The case reported by Lyons, even after plastic repair at the Mayo Clinic, required regular dilatation for some time afterwards, whereas in Delprat's case, in which an indwelling catheter was used and the perineal wound packed, with no plastic repair and considerable infection of the wound, no stricture resulted. In each of these cases the penis and urethra had been avulsed at the triangular ligament. Of the three cases reported by Gillies two apparently had some degree of post-operative obstruction. Certainly in none of my cases did incontinence appear until something like five years after the original mutilation.

In my series there was some variation in the degree of amputation of the external genitalia. That is to say, in some instances remnants of scrotal skin remained, but in only two or three cases was one testis preserved. In almost all the patients the volume of scar tissue was very great, due no doubt to the gross infection which must have followed the amputation. The length of penile urethra which remained was very variable.

In one case, for example, almost 2 in. (5 cm.) of urethra remained, and a dilated sac, ovoid in shape, contained over 1 oz. (28 mg.) of large faceted phosphatic calculi. In this case there was a minimum of scar tissue, and it was a simple matter to slit the dilated urethra and make a mucocutaneous suture 2 in. long. Six months later this large artificial meatus had contracted down to a length of $\frac{1}{2}$ in. (1.25 cm.), but the boy was still continent. In the majority of cases the length of penile urethra varied from $\frac{1}{2}$ to 1 in. and was not at all dilated between the scar and triangular ligament.

It was discovered by accident that the use of a post-operative indwelling catheter was unnecessary and inadvisable. Early in the series one of the boys removed his catheter on the day of the operation; four hours later he was still continent. It had been noticed, as expected, that the indwelling catheter in previous patients had caused some erosion and superficial suppuration of the suture line. Thereafter no indwelling catheter was ever used, and the boys were completely continent immediately after operation. Following micturition, which occurred only four or five times a day, swabbing the suture line and drying it with spirit resulted in rapid aseptic healing. It seemed a surprising thing that after two or more years of gross obstruction and overflow incontinence prolonged enough to cause hydronephrosis the bladder sphincters could regain their function instantaneously. Equally striking was the disappearance of the hydronephrosis, to be referred to later. In no case was there urinary infection.

Late Results

The immediate results were good in all cases operated on, complete continence being established at once. The later results were less satisfactory. In several of the earlier cases great contraction of the artificial meatus occurred, and dribbling of urine reappeared after about six months. Second operations, with a more generous slitting of the urethra posteriorly and a resultant longer line of mucocutaneous suture, were performed in these cases, and it became abundantly apparent that in all cases slitting of the remnant of penile urethra as far back as possible was very necessary in order to secure the longest possible line of mucocutaneous suture. Of equal importance was the minimizing of post-operative fibrous-tissue formation by the meticulous removal of all scar tissue at the operation and the securing of primary union by the avoidance of post-operative indwelling catheters and keeping the wound dry.

After these procedures were adopted late results appeared to be uniformly good. The period of follow-up was too short

in many of the cases, however, and it is quite possible that the ultimate results are less satisfactory. Contraction of the artificial meatus certainly seemed to be a continuous process in all cases, but fortunately in most of the boys it appeared to have ceased before the orifice became pin-point and obstruction recurred. But as it required five years for obstruction to occur after the original mutilation perhaps at least this period should elapse before a plastic repair is pronounced successful.

In only one case has complete failure to be recorded. Here the stump of penile urethra projecting beyond the triangular ligament was very short. Slitting of the urethra was out of the question, and mucocutaneous suture transversely around the short stump of urethra was all that was possible. Continence was maintained for only six months, and thereafter weekly dilatation of this post-operative stricture was necessary to preserve continence. Several plastic procedures were considered in this case, but none was ever tried out.

Should an attempt have been made to lay open the membranous urethra, with a long suture line to a skin tube previously constructed for the purpose? Apart from the almost certain risk of damage to the external sphincter I felt that the chances of resultant stricture were very high, and should such a stricture have occurred its regular dilatation would have been more difficult and probably more painful than dilatation of the existing stricture at the triangular ligament. At that time I was not aware of the plastic repairs that were being performed by Gillies, McIndoe, and others, but in retrospect I still feel, in view of the contraction at the artificial meatus in all cases, that in my hands post-operative stricture would have occurred at the junction of urethral mucosa and skin tube.

Other Factors

Cosmetic Repair.—It was felt that the construction of an artificial penis was not called for in those patients (all except two or three) who had lost their testes, and efforts were directed exclusively to the cure of urethral obstruction by the production of an artificial meatus which would remain patent.

A problem which caused great anxiety was the question of what to do in the two or three cases in which one testis remained. In these cases, in which there was no penis at all and therefore no apparent means of sexual gratification, and having regard to the lack of inhibitions which normally characterized the life of these people, it was felt that castration would be a kindly act. Nevertheless, it was not done. In retrospect I thought that was a mistake until I read the articles by Gillies and McIndoe, and I am now glad that I allowed these boys to retain their solitary testes. A surgeon in Addis Ababa may at some future date be able to perform such operations as those authors describe and restore sexual function to these unfortunate individuals.

Recent Mutilation.—I saw only one case of recent mutilation, and that prior to the series of late cases reviewed here. In 1941, during intertribal fighting in Abyssinia, a boy aged about 3 years was brought to me. The whole of his external genitalia, including both testes, had been amputated a few hours before. Bleeding had been comparatively slight, the wound was a clean incised one, and skin retraction had left a raw area about 2 in. in diameter. In the centre of the wound the stumps of the three corpora presented. I was working in the field at the time and sent him back to hospital, but the parents refused treatment and took him away.

Recovery of Hydronephrosis.—Apart from the recent case referred to above, all the boys had dilated bladders with overflow incontinence, which had been present for periods of up to three years. In every case in which pre-operative intravenous pyelography was done (some fifteen or sixteen in all) hydronephrosis was evident. The dilated kidneys were palpable in the majority of the boys. These cases were seen during the war years, when supplies were

short and great economy in the use of parabrodil was necessary. Attempts to procure a child's cystoscope for post-operative retrograde pyelography failed. Consequently I can report only three post-operative intravenous pyelograms. In each of these three patients, whose pre-operative pyelograms had shown advanced hydronephrosis, the shadows of a slender pelvis and concave calices had replaced the three circular shadows of the original pyelograms. In no case was the kidney palpably enlarged after operation, and I had the impression that the three cures demonstrated by pyelography were typical of the other cases also.

Summary

After amputation of the external genitalia in boys, untreated at the time and always grossly infected, overflow incontinence due to cicatricial contraction does not appear earlier than about five years; in an uncertain proportion of cases it does not occur at all.

Overflow incontinence, present for as long as two years or more, is relieved immediately the obstruction is removed. The bladder sphincters regain their function instantaneously.

An artificial meatus continues to contract for many months (perhaps for several years) after operation. Indwelling catheters across the suture line are to be avoided at all costs.

In the absence of urinary infection gross hydronephrosis due to low obstruction is curable in children.

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NEPHROCALCINOSIS INFANTUM WITH HYPERCHLORAEMIC ACIDOSIS

BY

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At the International Paediatric Conference held in London in 1933 Lightwood demonstrated post-mortem specimens from infants showing calcification within the renal collecting tubules. There was no abnormal extrarenal calcification or any sign of endocrine disease. In 1935 he described the clinical picture: failure to thrive, anorexia, vomiting, constipation, and pronounced hypotonia. A trace of albumin and a few leucocytes or epithelial cells were usually found in the urine. The previous suggestion of Putschar (1929) and of Thatcher (1931) that hypervitaminosis D might be the explanation of such a clinical picture with renal calcification was rejected. In a female infant with these clinical features Lightwood, MacLagan, and Williams (1936) demonstrated an acidosis which persisted for weeks.

Lightwood (1946) recorded a further case in an infant. The clinical features were similar to those he had previously described, and at necropsy the kidneys showed deposits of calcium both within and external to the renal collecting tubules.

Butler, Wilson, and Farber (1936) described persistent dehydration, hyperpnoea, hyperchloraemia, and diminished alkali reserve in four cases. Large deposits of calcium were observed post mortem both within and adjacent to some of the renal collecting tubules. Their patients were dehydrated in spite of a satisfactory fluid intake, and