- McCallum, Ian (1959). *Architecture, U.S.A.* The Architectural Press, London.
- McKeown, T. (1958). *Lancet*, **1**, 701.
- (1959). *Brit. med. J.*, **1**, 316.
- (1960). *Architects' J.*, **132**, 4.
- Stowe, L. M. (1959). *J. med. Educ.*, **34**, 1059.
- Sturdavant, M. (1960). *Comparisons of Intensive Nursing Service in a Circular and a Rectangular Unit.* American Hospital Association.
- Thoms, E. J., Giddings, L., and Lockward, J. (1958). *Mod. Hosp.*, **90**, No. 5, p. 73.
- University of Florida Press (1954-5). *Planning Florida's Health Leadership.* Ed. Louis J. Maloof, Vols. 1-5. Gainesville, Florida.
- Willard, W. R. (1960). *J. med. Educ.*, **35**, 93.

Medical Memoranda

Pruritus Ani Complicating Transplantation of the Ureters

This is a case report of an uncommon condition. No detailed records of a previous case have been found by either the B.M.A. or Smith Kline and French libraries.

Jacobs and Stirling (1952) mention one case of proctitis in a series of 1,673 patients. Clarke and Leadbetter (1955) do not record any cases in a series of 2,897 patients.

The discomfort suffered by my patient was severe enough to make his history worth reporting in detail.

CASE REPORT

The patient first had haematuria in 1936. A simple papilloma was removed at open operation. He remained well until 1942, when he suffered a relapse and required operation with fulguration. He had no further haematuria until 1953, when a recurrence of the papilloma was treated by diathermy at cystoscopy. In 1955 he had another resection. Until then all histological reports had described a simple papilloma.

In 1956 he had more bleeding. A diagnosis of malignant papilloma of the bladder was made, and in consequence he received two courses of deep x-ray therapy.

In January, 1958, he suffered a severe prolonged haemorrhage which was treated by cystectomy and colonic transplantation of the ureters. It was not possible to remove the whole bladder and some malignant tissue was left behind. The histological report after his discharge from hospital was "transitional cell carcinoma of the bladder." He remained well until March, 1959, apart from some urethral leakage of blood from the malignant stump, and an incisional hernia. At the beginning of March, 1959, he complained of pruritus ani which he himself had treated, unsuccessfully, with 1% cinchocaine ointment. I persuaded him, with difficulty, to allow me to examine him.

He had anal dermatitis. The skin was red, raw, and weeping. The lesion began at the upper end of the natal cleft and extended anteriorly over the entire perineum to the scrotum. It was beginning to affect the skin over the buttocks. The itch was intense. Cinchocaine and coal tar failed to produce improvement. By the beginning of April the dermatitis had spread over the entire scrotum and was advancing over the pubic symphysis to the anterior abdominal wall.

On April 7 biochemical investigations were begun. The urinary pH was 9 and the urinary ammonia was 230 mg./100 ml. (expressed as total nitrogen: normal = 50 mg.). Serum sodium, potassium, chloride, and carbon-dioxide-combining power were all within the normal range. The high ammonia reading suggested that the cause of the dermatitis was ammoniacal irritation following decomposition of the urine by urea-splitting organisms. Bacteriological

culture of anal and perianal swabs yielded "growth of *B. proteus* sensitive to chloramphenicol, streptomycin, and nitrofurantoin."

His treatment was changed to topical magnesium sulphate and oral sulphafurazole. On April 17 the urinary ammonia was 226 mg./100 ml., and the pH was 9. There was some clinical improvement, but not sufficient to justify perseverance with this treatment. It was altered to $\frac{1}{4}$ % hydrocortisone in lactocalamine applied twice daily and oral nitrofurantoin 50 mg. four times daily. By May 1 the itch had gone and the skin lesion was dry and healing. The urinary ammonia was 198 mg./100 ml., though the pH was 9.5. A culture of an anal swab on May 4 yielded "no intestinal pathogens notwithstanding the use of enrichment media." Because of the marked improvement all treatment was stopped, and on May 22 the urinary ammonia was 46 mg./100 ml. and the urinary pH 7.5.

The patient remained clinically well and required no further treatment until August, 1959, when he had further urethral bleeding, for which he was admitted to a hospital for chronic diseases. He had no further pruritus.

COMMENT

The clinical course and investigations indicate that the patient's pruritus ani was produced by ammoniacal dermatitis. The source of the ammonia appears to be the decomposition of urea to ammonia by *Proteus* (probably *vulgaris*).

The following features of the case require comment: (1) the infrequency of the condition, (2) the anomalous behaviour of the urinary pH, and (3) the choice of treatment.

Proteus vulgaris is often found in small amounts in the normal bowel and is a frequent invader in the deranged bowel. It is a potent urea-splitting organism. Why, therefore, is ammoniacal dermatitis such an infrequent complication of uretero-colic anastomosis?

Though the urinary ammonia in this case had dropped from 240 to 198 mg./100 ml. by the third reading the urinary pH had risen from 9 to 9.5. This may be accounted for by the fact that the urine of patients with transplanted ureters is frequently alkaline, owing to chloride retention (L. N. Pyrah, 1959, personal communication). Nevertheless the high urinary ammonia must have contributed to the raised urinary pH.

Sulphafurazole was selected as the first antibiotic to attack the proteus in order to avoid the possibility of diarrhoea produced by secondary bacterial invasion after more potent antibiotics. Since it was not effective enough, it was replaced by nitrofurantoin.

Local treatment was chosen on clinical grounds. The dermatitis was refractory and refused to respond to any treatment other than hydrocortisone. Since the itch was intense, local treatment was necessary until the antibiotic had produced a significant result.

I thank my senior partner, Dr. D. Jacob, who gave permission to manage and report the case; and Dr. F. Mitchell and the staff of the biochemical department of Maryfield Hospital, Dundee, and Dr. Green and the staff of the bacteriological department of Queen's College, Dundee, for performing the laboratory investigations and for helpful suggestions. All surgical treatment was done by Mr. G. M. Sturrock, of the Royal Infirmary, Dundee.

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REFERENCES

- Clarke, B. G., and Leadbetter, W. F. (1955). *J. Urol.*, **73**, 999.
- Jacobs, A., and Stirling, W. B. (1952). *Brit. J. Urol.*, **24**, 259.