impairment to hearing "arising out of and in the course of a man's occupation" is not to be pooh-poohed. We are getting them, why shouldn't you?

Summary

Current methods of industrial insurance in the United States are described, and the value of the insurance companies' inspection schemes is stressed. The origin and development of industrial hygiene services in the United States are recounted.

The role of the industrial hygienist in establishing a safe working environment in industry is emphasized, and threshold limits for various toxic substances, adopted by the American Conference of Governmental Industrial Hygienists in 1953, are listed.

The control of noise in industry is referred to.

LATE RESULTS OF TRANSPLANTATION OF URETERS INTO THE PELVIC COLON*

BY

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After successful implantation of the ureters to the bowel late results will be determined by the type of lesion for which the operation was performed, by the continued integrity or otherwise of the upper urinary tract, and by the effects of chemical imbalance, if any, that may follow the urinary diversion. The nature of the lesion is a dominating factor, particularly in the initial years, when patients who have bladder cancer may die from localized recurrence or distant metastases, and those with genito-urinary tuberculosis may succumb to continued or renewed activity of the disease. When, on the other hand, there has been no constitutional disease, as in cases of trauma or congenital anomalies, results are largely influenced by a continuation of good renal function. I have carried out uretero-colic anastomosis on 162 patients, and all were followed up to April, 1953, or to the time of death. Approximately one-half of these operations had been performed during the previous five years and the remainder over the preceding 15 years. Sixty-nine patients were living in April, 1953, 26 of whom had survived for periods of 6 to 16 years (Table I), and 43 from a few weeks to five years. Six

patients now dead lived for periods of 5 to 17 years after operation. It is thus possible to discuss end-results from observation of an adequate number followed over a sufficient time interval. I shall not give full statistical tables, having already done so in a previous communication which dealt with 138 case records (Jacobs, 1952). Relevant data from my series and from the survey of 1,673 patients operated on by 137 surgeons made for the British Association of Urological Surgeons are quoted (Jacobs and Stirling, 1952).

Malignancy

Because of the increasing use of cystectomy as a method of treating bladder cancer malignant disease has become the most frequent indication for transplanting the ureters. It was the reason for operation on 1,181 (70%) of the B.A.U.S. series. Urinary diversion by itself may be carried out as a palliative measure and was in fact the sole procedure in 476 of these 1,181 patients. The mortality rate was surprisingly high (39.7%). It was obvious that an undetermined number for whom a second-stage cystectomy had been planned succumbed to a preliminary uretero-colic anastomosis, for cystectomy in addition to transplantation on the remaining 705 patients carried a very much lower mortality (15.2%). Uretero-colic anastomosis for malignant disease should not nowadays be associated with such a high mortality rate, and it is a useful method of easing the last months of suffering from bladder cancer when this is associated with intolerable pain and profuse bleedings. It may be difficult to decide whether or not a palliative operation should include cystectomy when obvious spread precludes any hope of a curative procedure, though the bladder is still removable. Thus in a man of 61 with a deeply penetrating sessile umbilicated tumour of only 2 cm. diameter on the left postero-superior wall, the bladder capacity was down to 2 oz. (57 ml.) and he had suffered a half-hourly frequency for nearly a year. Although enlarged glands were palpable alongside the left iliac vessels, the bladder, not being fixed, was removed. The patient died nine months later with a metastatic focus in the head of the right femur and in a lung. Equal relief might have been obtained from transplantation alone, but removal of the bladder made for greater certainty in ensuring against a continuance of vesical strangury as well as of haemorrhage.

A review of late results after transplantation and cystectomy reveals that as a curative measure this radical procedure has not fulfilled the hopes entertained from it. The B.A.U.S. survey showed that among the 705 patients so treated the operative mortality (death within four weeks) was 107, that 216 had failed to survive one year, and that a further 112 had succumbed before the elapse of another two years. Thus 61% of the total had died within three years of operation. Nevertheless evidence is available that cystectomy for early carcinoma with minimal infiltration not going beyond the muscularis can give good end-results, but so also do some of the more conservative measures. Misplaced enthusiasm should not blind us to established facts, which indicate that cystectomy can actually diminish a patient's defence against the malignant spread and that the operation should be employed only on a selective basis. My own series of transplantations for malignancy number 62. Six had extravesical malignant lesions, and 44 of the remainder with bladder cancer had cystectomy in addition to the urinary diversion.

In earlier years, when the tendency was to perform cystectomy for the advanced lesion, I became impressed by the futility of the operation as a curative procedure in such cases, for most of the patients soon developed pelvic recurrence or distal metastases and failed to survive a complete year. Accordingly I now reserve cystectomy for selected cases with multiple non-penetrating tumours of widespread distribution, for the broad-based sessile papillary growths on the lower zones which have not infiltrated, and as a palliative for tumours which have penetrated, when

TABLE I.—Uretero-colic Anastomosis. 26 Patients Living 6 to 16 Years

Years	No.	Trauma	Con-genital	Tuber-culous	Con-tracture	Malignant
16	1	1	—	—	—	—
15	—	—	—	—	—	—
14	—	—	—	—	—	—
13	3	2	1	—	—	—
12	—	—	—	—	—	—
11	2	1	—	1	—	—
10	4	3	—	—	1	—
9	1	—	1	—	—	—
8	3	1	—	2	—	—
7	6	3	—	3	—	—
6	6	3	—	1	1	1
Total	26	14*	2	7	2	1

* 11 of these 14 had a vesico-vaginal fistula.

*Part of a Urology Lecture delivered at the Royal College of Surgeons of England on April 22, 1953. (The indications for operation and the methods of uretero-colic anastomosis used were discussed in the preliminary sections of the paper.)

bleeding as well as pain renders uretero-colic anastomosis by itself insufficient as a measure of relief. I date this policy of selection to the beginning of 1949. Fourteen of the operations were performed before that date; not one of the patients is alive, and only three survived beyond two years; one reached his fourth year and then succumbed to asthma and myocardial failure. Fifteen of the 28 patients operated on from January, 1949, onwards are alive and five of them who had their operations in 1949 have reached or passed four post-operative years with no evidence pointing to local or distant recurrences.* These facts indicate a useful role for uretero-colic anastomosis with cystectomy as a method of treating bladder cancer when selection is made on a basis such as I have suggested; the improbability of obtaining good long-term results in the infiltrating variety of growth is also apparent.

Tuberculous Vesical Contracture

My series includes 52 cases of urinary tuberculosis. In 28 the transplanted ureter was from a kidney which was tubercle-positive, and in 30 an extra-urinary tuberculous focus was clinically demonstrable. The urinary diversion for many in this group was thus a method of relieving the last years and sometimes months of their lives, yet the longevity of these patients so afflicted is sometimes surprising. Of 28 still living 7 have survived for six to eleven years, and 12 for three to five years subsequent to the transplantation. During 1950 I had occasion to transplant 10 patients suffering from urinary tuberculosis. One of them, who had a Coffey transplant, died within a year of operation. The other nine not only survived but continued to live useful lives. Seven of these nine patients had a direct anastomosis by the Nesbit technique, and in four the ureter thus implanted was from a tubercle-positive kidney. These facts show the benefits that can be expected from the unobstructed drainage that generally follows the direct methods of anastomosis. I now, however, prefer to employ Leadbetter's modification of Nesbit's operation, as this method reduces to a minimum, if it does not entirely obviate, the possibility of air or bowel content reflux.

In discussing the tuberculous group special mention must be made of those who have gross hydronephrosis and hydro-ureter of the remaining kidney. This dilatation may be due to back pressure resulting from the contracted bladder, or to stricture in the ureter not necessarily associated with a bladder contracture, as was the case in a young woman of 22 who had a left nephrectomy in 1948, when the bladder capacity was 14 oz. (400 ml.). After removal of the kidney the urine remained tubercle-positive, but she had no frequency or other bladder symptoms. In 1950, two years after the nephrectomy, she had three attacks of obstructive anuria lasting for periods of 14 to 36 hours. Gross hydronephrosis and hydro-ureter had developed as a result of a stricture which was located 6 cm. above the ureteric orifice. The bladder capacity remained unimpaired. At operation the lower segment of the ureter was resected to above the level of the stricture and the dilated tube implanted by the end-to-side technique. Twenty-seven months later she was well and leading an active social life.

What I have related about the results of transplantation in urinary tuberculosis confirms that it can be a beneficent procedure for many. It of course does nothing to stay the progress of the disease, but it can in some instances prevent the progressive destruction of the patient's solitary functioning kidney, and for those with severe bladder contracture the relief of the persistent frequency or incontinence that follows the urinary diversion is immense.

Trauma, Non-tuberculous Contracture, Anomalies

It is convenient to consider together the results of urinary diversion for trauma, non-tuberculous contracture, and congenital anomalies, for these lesions are in themselves non-killing ones, though health may be impaired by long-

*These five patients have now entered their sixth post-operative year.

standing urinary infection which is often associated with dilatation of the upper urinary tract. My total patients in the three groups number 48. In the B.A.U.S. series these conditions were together the reason for operation in 16.7% of the total, the operation carrying a 10% mortality for trauma, 11.3% for congenital anomalies, and 13.3% for bladder contracture. The life tables showed that 79.5% of those operated on for congenital anomalies had an expectation of life of three years or more and 76.6% of five years or more, a difference in the two years of 2.9%. A combined computation for trauma and contracture, on the other hand, revealed that a life expectation of three or more years was applicable to only 62.5% and of five years or more to 55.4%, the drop in the two years amounting to 7%. It is opportune, therefore, at this point to examine possible causes of late morbidity and mortality, uninfluenced by the actual lesion for which the urinary diversion was performed.

Morbidity and Electrolyte Imbalance

In my series 23 patients belonging to the above-mentioned three groups were still living in April, 1953. Their survival period to that date was up to 5 years in six, 5 to 10 years in eleven, 11 to 16 years in six. The longest survivor so far was a patient, now deceased, who died after an operation for malignant pancreas 17 years subsequent to transplantation for vesico-vaginal fistula.

In January, 1953, a lad of 17, whose ureters I had transplanted six years previously, died. The established cause of death was typical of what, in like circumstances, may follow many years after operation. He first came under my care in 1947, when he was 11 years old. He is one of the two patients on whom I have performed urinary diversion subsequent to a ruptured urethra, which in his case had been sustained three years earlier as a result of being run over. He had been left with a permanent suprapubic tube. Transplantation by the Coffey I method was performed after efforts to re-establish the urethral lumen had failed and when both ureters had already become grossly dilated. In June, 1952, five years after the uretero-colic anastomosis, he was sent back to hospital because a visible suprapubic swelling had developed. Almost 20 oz. (570 ml.) opaque fluid was aspirated from his bladder by needle and syringe. This fluid contained mononuclear cells and abundant spermatozoa. Six months later (January, 1953) he was again admitted, as the suprapubic swelling had reappeared and an approximately similar quantity of spermatic fluid was once more evacuated from his bladder. At this stage it was decided to carry out a cystectomy. Intravenous urography had shown a persistence of the upper urinary tract dilatation and the blood urea was 80 mg. per 100 ml. There was no clinical or biochemical evidence of hyperchloraemic acidosis (Table II). On the

TABLE II.—Blood Chemistry 6 Years after Transplantation (2 Days Before Death)

Blood urea	80 mg. per 100 ml.
CO ₂ combining power	56.7 ml. CO ₂ per 100 ml.
Plasma chlorides	97 mEq per litre
Plasma sodium	146
Serum potassium	5 " " "

evening before the day designated for operation he suddenly became febrile. The high temperature with malaise continued into the next day and the operation was cancelled. He died that evening, after a sudden convulsive seizure. Post-mortem examination showed gross bilateral hydro-ureters and hydronephrosis, with marked infection on the left side.

Although long survival in apparent good health is not uncommon in spite of an impaired upper urinary tract, it is incontestable that the development of dilatation and infection and their aggravation when such existed before operation are fundamental factors influencing morbidity and mortality. To what extent, then, is well-being affected by electrolyte changes? The B.A.U.S. survey showed that almost 50% of patients were in electrolyte imbalance at some stage in their post-operative career, and it is now

unquestionable that selective absorption from the bowel can result in hyperchloraemic acidosis and other chemical disturbances.* The capacity to deal with this seems, however, to be closely related to renal function. The analysis of the B.A.U.S. series and of my own revealed that 75% of those whose blood chemistry findings indicated hyperchloraemic acidosis had an elevated blood urea as well as objective evidence of renal impairment on excretion urography. It also showed that only 20% of that number exhibited symptoms of chemical imbalance and that almost without exception chemical imbalance with symptoms was associated with a raised blood urea and dilatation of the upper urinary tract.

I have recounted the mode of death which rapidly ensued after six years of well-being when there was no evidence of hyperchloraemic acidosis or even of acidosis, and for which a sudden overwhelming renal infection seems to have been responsible. Recently another patient died, 11 years and 6 months after transplantation for vesico-vaginal fistula. The Coffey technique had been used and there was no renal or ureteral dilatation at the time of operation. Just over a year before death biochemical examination had shown an elevated plasma chloride with a lowered alkali reserve (Table III). There was then well-marked dilatation in the

or colostomy which the procedure necessitates is a negation of one of the main objectives of ureteral transplantation—namely, to restore the patient to a normal-like way of life. It is as well to dispense with the uretero-colic anastomosis and divert the urine by ureterostomy.

Summary and Conclusions

The results of carrying out uretero-colic anastomosis on 162 patients are analysed.

It is evident that, provided the lesion for which urinary diversion is performed is not one which itself predisposes to ill-health and eventual mortality, transplantation of the ureters to the bowel can be followed by well-being and expectation of a long life. This in great measure is influenced by the renal status, which in turn is largely dependent on the success of the actual anastomosis. The union between ureter and bowel must therefore be accomplished with as high a degree of technical perfection as possible.

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TABLE III.—*Blood Biochemistry after Transplantation of Ureters in May, 1941*

	June, 1951	Nov. 19, 1952	Nov. 26, 1952
Blood urea ..	28 mg./100 ml.	198 mg./100 ml.	196 mg./100 ml.
CO ₂ combining power ..	48.1 ml. CO ₂ /100 ml.	35 ml. CO ₂ /100 ml.	21 ml. CO ₂ /100 ml.
Plasma chlorides ..	109.4 mEq/litre	103 mEq/litre	117 mEq/litre
Plasma sodium ..	142 ..	..	..
Serum potassium ..	5.5 ..	..	3.1 ..

upper urinary tract, but the blood urea was only 28 mg. per 100 ml. She was working as an assistant hotel cook and her only complaint was that she had become very stout. In December, 1952, she was admitted to another hospital in a semicomatose condition, having been unwell for the previous 10 days, suffering from mild rigors and pain in both renal areas. Her blood urea was 198 mg. per 100 ml., but plasma chlorides were actually lower than a year previously. Acidosis was confirmed, the alkali reserve having further fallen. She failed to respond to alkaline therapy and died nine days after admission. Four days before death she exhibited definite hyperchloraemic acidosis though the urine output had risen from 7 to over 70 oz. (200 to over 2,000 ml.) a day. Post-mortem examination showed bilateral renal dilatation, moderate on the right, marked on the left, the kidney on that side having only a strip of functioning tissue, and the left uretero-colic anastomosis stenosed though patent. The histological picture was of advanced pyelonephritis.

The severe electrolyte imbalance which finally developed in the above instance was associated with gross renal damage and uraemia. I can find no evidence of any patient in my series whose death could be attributed solely to chemical imbalance. Indeed, I have had but few incidents in the past three years—during which I have been on a constant lookout for them—of serious disturbances arising from this cause, and such as have been encountered without marked renal damage have been readily corrected by appropriate infusion therapy, alkalis, and an in-dwelling rectal tube. Less severe symptoms, such as anorexia, thirst, salty taste, and polydipsia, are generally improved by regular evacuation of urine, salt limitation, and alkalis. I therefore deprecate transplanting the ureters into a segregated loop of bowel as a precaution against the onset of electrolyte disturbances. This measure will not eliminate the possibility of subsequent renal damage due to faulty union between ureter and bowel, and the wet enterostomy

PSYCHOPATHIC STATES AND ATTEMPTED SUICIDE

BY

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Suicidal attempts are medical emergencies which the general practitioner and the hospital surgeon and physician alike have to meet, since in many instances it is found necessary to remove the suicidal individual from his home to hospital for resuscitation or repair. When his physical treatment has been completed it often happens that he appears remarkably normal: if, as he may do, he then insists on his discharge from hospital, grounds for detaining him longer may not be found. There is evidently a type of suicidal attempt, dangerous enough to need medical intervention, of which the more obviously morbid mental accompaniments are transient. In some centres these cases are not referred to psychiatrists and pass quickly from observation; this apparently is one of the reasons why a relatively common phenomenon has been so little investigated. Experience over some years in a general hospital where all cases of attempted suicide are examined by a psychiatrist has shown that the large majority of these "birds of passage" are suffering from psychopathic states.

Henderson (1939), focusing attention on the suicidal proclivities of psychopathic individuals, gave a description of the situation which is admirable in its emphasis on the peculiar clinical features and the social implications. His lead has, however, not been followed; and it is thought that a detailed survey of a group of such cases might now promote their more general recognition and stimulate further research, particularly into their aetiology.

There are few papers in the literature which indicate the proportion of cases of attempted suicide which may be attributed to psychopathic states. Dahlgren (1945), in a follow-up study of 237 cases of attempted suicide, gave 12.2% (26 men, 3 women) the diagnosis of psychopathia; but his clinical material was unsatisfactory, being

*The reader is referred to the important contributions on the subject of chemical imbalance after uretero-colic anastomosis, published in the *British Journal of Urology*, 1952, 24, pp. 302, 307, 313, 317.