RECOVERY FROM URAEMIA FOLLOWING CRUSH INJURY

BY

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As pointed out by Surgeon Lieut.-Commander Maitland (1941), isotonic sodium sulphate solution has been advocated as a potent diuretic from time to time. In view of the original oliguria and raised blood pressure in the case reported below it was considered unwise to give more than a pint at a time; it seems now that a larger initial dose, given slowly, might have produced more rapid results.

I have no original suggestions to make on the pathogenesis of the condition, but it is obvious from a consideration of this case and of the one reported by Mayon-White and Solandt (1941) that the syndrome is not produced by transfusion of incompatible blood and that it is not a nephritis of an ordinary type. It seems that the syndrome is the result of prolonged compression of a limb, or limbs, with subsequent release of pent-up katabolites of a toxic nature having a characteristic action on renal epithelium. While the renal lesion may be progressive up to a point, the first (fatal) case reported by Bywaters and Beall (1941), in which the affected limb was amputated on the second day, suggests that renal damage may be gross at an early stage; while the present case, together with R. V. Christie's case (quoted by Bywaters and Beall), proves that the lesion is not necessarily a fatal one. Furthermore, on superficial examination it seems that many air-raid casualties, and presumably civil accident cases, that have not been subjected to prolonged or severe crushing exhibit granular casts in their urine and have mild degrees of oliguria for variable periods. Research on these points seems to be indicated.

Case Record

A man aged 32 was admitted to hospital as an air-raid casualty on May 7, 1941. From about 1 to 9 a.m. on May 6 he had been pinned down by heavy debris across his left shoulder and

Chart of Case. Continuous line=output of urine in oz. per day. Thick broken line=output of urea in gm. per day. Fine dotted line=blood urea in mg. per 100 c.c.m.

upper arm; he had suffered no other serious injury. He had received first-aid treatment in the neighbourhood of the air raid and had been in bed in a damaged hospital for about thirty-two hours before being transferred. No transfusions had been given.

On admission his general condition was very satisfactory. The left arm was grossly swollen and reddened, and numerous wheals

were present on it. Movement at all the joints of the limb was very restricted, and there was anaesthesia from the mid-arm distally. The circulation was intact and the radial pulse palpable. The possibility of renal failure developing was considered at this point, but no prophylactic measures were taken other than to administer fluids by mouth. The arm was wrapped in cotton-wool and elevated.

On May 10 he suffered from hiccup for a short while. This became more persistent in the next forty-eight hours. The tongue was dry, for the first time, on the morning of the 12th, and despite a liberal intake of fluids the output of urine for the preceding twenty-four hours had been only 30 oz. The blood urea was 390 mg. per 100 c.c.m. Active treatment was begun immediately, 40 c.c.m. of 25% glucose being given intravenously, followed by 540 c.c.m. of isotonic sodium sulphate solution. During the next few days the output of urine and, later, of urea was measured; the blood urea was estimated daily while intravenous sodium sulphate solution in 540-c.c.m. doses was given. The clinical course is shown on the chart.

During May 12-16 the tongue remained dry and coated and the patient was restless and rather childish, though otherwise rational. On the 17th his local and general condition began to improve and thereafter continued to do so. At the beginning of June there was still some loss of power in the whole limb, but no swelling and no anaesthesia; and some hyaline and a few granular casts were present in the urine. (At the beginning of the illness there were very numerous granular casts, no hyaline casts, a few red blood cells, but no blood casts and no reaction to the guaiac test.)

The patient had never suffered from nephritis or any disease likely to predispose to it.

Summary

A case of limb-crush injury with subsequent uraemic manifestations and recovery is briefly described. A short discussion on the production of the lesion in the light of previously recorded cases is given. It is suggested that mild cases may have previously passed unnoticed and that they may result from injuries of different types.

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REFERENCES

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MEDICAL RESEARCH COUNCIL OF IRELAND

The Medical Research Council of Ireland has made the following awards during the half-year ended June 30, 1941. Training grants: Miss D. A. Kilbride for one year from August 1, 1941, to carry out an investigation of iodine absorption by means of Balance experiments; and Miss E. O'Donovan for one year from June 1, 1941, to assist in the investigation of the goitre problem by studying the retention of iodine under varying conditions of diet, the work in both instances to be done in the department of chemistry, University College, Cork, under the direction of Prof. J. Reilly and Dr. E. M. Mason. Whole-time grant: Dr. Cecil Mushatt for four months from March 1, 1941, to enable him to continue his research work at the Johns Hopkins Hospital, Baltimore, Maryland, U.S.A. Grants-in-aid: Dr. James Deeny for six months from July 1, 1941, to investigate the relationship of vitamin C to the formation of complement and the relationship of both to immunity; Dr. D. K. Malley to investigate the effects of the cortical hormone on a case of pre-adolescent type of adrenocortical syndrome; and Dr. J. G. Waugh towards the expenses of his research work on sulphonamide therapy in the School of Physic, Trinity College, Dublin.

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