been reports of cases recovering without specific chemotherapy (Tesdal, 1934; Magarey *et al.*, 1935), the availability of antibacterial drugs has greatly altered the prognosis and improved the chance of cure. Nevertheless, *Bact. coli* meningitis remains a serious infection.

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Acute Renal Failure After Phenylbutazone

Of the many toxic actions of phenylbutazone ("butazolidin"), its renal effects have received scant attention, although most published series include isolated instances of haematuria and proteinuria. It is not easy to ascribe oliguria or anuria to a drug the toxic side-effects of which already include diarrhoea, vomiting, and salt retention, but the clinical evidence in the following case is strongly suggestive of this complication.

CASE REPORT

A woman aged 61, who had had rheumatoid arthritis for 15 years, was admitted to hospital at 9 p.m. in a state of collapse. She complained of severe vomiting, diarrhoea, and colicky abdominal pain for twelve hours and had had nausea, anorexia, and giddiness for two weeks.

On admission she was very drowsy and distressed from nausea and vomiting. Her temperature, pulse, and respiration were all normal. Her tongue was dry and the throat red, but hydration was otherwise good. There were no abnormal signs in the chest, abdomen, or central nervous system, and the blood pressure was 175/90.

Anuria became obvious the following morning, by which time an uncharted amount of fluid had been allowed. She was still drowsy and appeared overhydrated, with basal crepitations, raised jugular venous pressure, and palpable liver edge, but no pitting oedema. The bladder was empty. A cause for anuria was sought, and on further questioning it transpired that she had passed no urine since 1 p.m. of the day before admission. Moreover, she normally passed urine frequently, usually getting up four times nightly, but had voided very little for two days. She maintained adamantly that scant micturition had preceded the vomiting, and also that it could not be accounted for entirely by a decreased fluid intake from nausea.

Past treatment for arthritis, which had failed to provide substantial benefit, included aspirin, physiotherapy, and over one hundred injections of gold, but no injections had been given for three years. Phenylbutazone, 1,200 mg. daily, was begun two years ago, the dose being reduced to 600 mg. daily after three months, and for six weeks until the time of admission she had been taking 200 mg. daily. The original effect was described as miraculous, and, whereas before taking the drug she had been crippled to a bed-and-

chair existence, only the day after starting phenylbutazone, to the intense delight of her family and herself, she was able to walk downstairs free from pain.

A diagnosis of acute renal failure related to phenylbutazone administration seemed likely, and treatment with an intragastric drip of glucose and arachis oil emulsion was instituted on the morning after admission, to be discontinued after six days, when the urinary output was satisfactory. Catheterization of the bladder on the second day yielded 12 oz. (340 ml.) of dark brown acid urine containing red cells, epithelial cells, and albumin ++; the chloride content was 2 g. per litre and the urea concentration 0.7 g.%; culture was sterile. A blood count showed a haemoglobin of 77% and total leucocytes of 22,000 per c.mm. (polymorphs 93%, lymphocytes 7%). The other investigations are summarized in the Table. Before the patient left hos-

Results of Investigations

Day in Hospital	Urine Output		Serum Levels in mEq/l.				Blood Urea (mg./100 ml.)	Hb (%)
	oz.	ml.	Na	K	Cl	HCO ₃		
1	0	0	—	—	96	17	105	77
2	0	0	—	—	105	22	130	
3	12*	340*	132	5.2	101	24	100	
4	+12†	+354	126	6	101	24	100	150
5	12†	354	126	6	101	24	100	
6	14†	410	124	5.5	103	24	103	
7	34†	980	124	4.7	100	22.5	150	66
8	31†	880	124	4.7	100	22.5	150	
9	54	1,534	124	4.7	100	22.5	150	
10	68	1,930	124	4.7	100	22.5	150	66
11	50	1,420	124	4.7	100	22.5	150	
12	83	2,357	124	4.7	100	22.5	150	
13	82	2,329	124	4.7	100	22.5	150	66
14	78	2,215	124	4.7	100	22.5	150	
15	56	1,590	124	4.7	100	22.5	150	
16	27	767	124	4.7	100	22.5	150	66
17	49	1,392	124	4.7	100	22.5	150	
18	49	1,392	124	4.7	100	22.5	150	

* By catheterization.

pital her urine contained albumin +, no red cells, and the reaction was neutral. On follow-up one month later she felt well and her arthritic condition had not relapsed. Frequency of micturition had returned, the urine contained no albumin, and the blood chemistry was normal.

COMMENT

Bruck *et al.* (1954) described a fatal outcome in an elderly patient in whom oliguria might have been precipitated by phenylbutazone, and histological examination of the kidneys showed degenerative changes in the tubules. They attributed oliguria to salt retention. C. Thornton (1954, personal communication) has had a similar experience in a 7-year-old child with Still's disease, who developed a rash after nine days' treatment with phenylbutazone, 200 mg. daily. Although the drug was discontinued immediately, the child became oliguric, with a blood urea of 128 mg. per 100 ml.

Evidence that phenylbutazone was the cause of acute renal failure in the patient described here can only be circumstantial. The presence of proteinuria and haematuria indicates renal damage. It might be argued that vomiting from some other cause resulted in an extrarenal uraemia, but this is unlikely because dehydration was absent, the blood pressure was not lowered, and the onset of oliguria preceded that of emesis. The alternative explanation of salt and water retention is equally unlikely in view of the normal serum sodium levels and the normal state of hydration on admission. We therefore suggest that, in addition to salt and water retention, oliguria or anuria from phenylbutazone may be due to renal damage, and that such toxicity may become manifest after small doses or prolonged administration.

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