

# Urinary Calculi\*

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## SUMMARY

The chemical composition of 256 urinary calculi on the Witwatersrand has been determined in 3 population groups. 'Calcium stones' comprised 53,1% of the total and most of the remainder were triple phosphate. The distribution of these stones in the different population groups was similar. Urinary calculi are rare in the Bantu.

*S. Afr. Med. J.*, 47, 128 (1973).

The purpose of this study was to determine and compare the chemical types of urinary calculi, as they occur in the Witwatersrand area. Stones from the White, Bantu and Coloured population groups were analysed.

## MATERIAL

In the 2-year period from May 1970 to April 1972, 256 calculi from various hospitals on the Witwatersrand were submitted to the South African Institute for Medical Research for chemical analysis. The stones considered were renal or ureteric, either surgically removed, or passed spontaneously. Calculi occurring elsewhere in the urinary tract were not included in this series.

The method used to determine the chemical composition of the calculi was that described by Varley.<sup>1</sup>

## RESULTS

Of the 256 stones analysed, 219 were from the White, 16 from the Bantu and 21 from Coloured population groups (Table I).

TABLE I. DISTRIBUTION OF URINARY CALCULI IN THREE POPULATION GROUPS

Types	Whites		Bantu		Coloured	
	No.	%	No.	%	No.	%
Calcium oxalate ... ..	7	3,2			2	9,5
Calcium oxalate + magnesium ammonium phosphate (mixed) ... ..	99	45,2	7	43,8	14	66,7
Calcium phosphate ... ..	7	3,2				
Magnesium ammonium phosphate; calcium phosphate (triple phosphate) ... ..	90	41,1	8	50	5	23,8
Uric acid ... ..	9	4,1	1	6,2		
Cystine ... ..	2	0,9				
Fibrin ... ..	5	2,3				
<b>Total</b>	<b>219</b>	<b>100</b>	<b>16</b>	<b>100</b>	<b>21</b>	<b>100</b>

\*Date received: 1 August 1972.

In the White group there were 113 (51,6%) 'calcium stones', comprising 7 calcium oxalate, 99 mixed, and 7 calcium phosphate stones. There were 90 (41,1%) triple phosphate, 9 (4,1%) uric acid, 2 (0,9%) cystine, and 5 (2,3%) fibrin stones.

In the Bantu group there were 7 (43,8%) mixed, 8 (50%) triple phosphate and 1 (6,2%) uric acid stones.

In the Coloured group there were 16 (76,2%) 'calcium stones' comprising 2 calcium oxalate, and 14 mixed. There were 5 (23,8%) triple phosphate stones.

## DISCUSSION

Qualitative analysis showed that 53,1% (136) of all the stones were 'calcium stones', i.e. calcium oxalate, mixed or calcium phosphate, whereas triple phosphate stones comprised the majority of the remainder. This may be compared with other Western series where Herring<sup>2</sup> found 73,1% and Nordin<sup>3</sup> 79,5% calcium oxalate stones.

Most of the stones (85,6%) were received from the White group. Only 6,2% came from the Bantu and 8,2% from the Coloured group. Considering the population distribution on the Witwatersrand, where there are approximately one and a half times as many Bantu as Whites, the incidence of calculous disease is far less in the former than in the latter. This is in keeping with the known low incidence of urinary calculi in the Bantu.<sup>4-7</sup> The Coloured population sample on the Witwatersrand is too small to draw any conclusion about the incidence of stones in this group.

There appears to be no significant difference in the proportion of 'calcium stones' and triple phosphate stones in the 3 population groups.

In general, the smaller calcium stones contained the highest proportion of oxalate, while the larger ones contained increasing proportions of magnesium ammonium phosphate. Four of the uric acid and one of the cystine stones also contained magnesium ammonium phosphate. It is suggested that magnesium ammonium phosphate is laid down secondary to stasis or infection caused by the primary stone.

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