# URINARY STONES IN KELANTAN, MALAYSIA — A TWO YEAR REVIEW

K G Lim, R H Edward, G L G McAll, Mya Thaung
Nor Akmal Wahad, Gheetha Arimainayagam

**SYNOPSIS**

**216 patients were found to have had surgery for urinary calculi in a retrospective analysis of surgical records of the two general hospitals in Kelantan over a two year period. Excluding 11 patients from Terengganu and 2 patients resident in Kelantan for less than 1 year, this amounts to an annual incidence for calculus surgery of 10 per 100,000 residents per year.**

**Lower urinary tract (LT) calculi (143) were more common than upper urinary tract (UT) calculi (71). There was an overwhelming majority of males among patients operated on for LT calculi (ratio of males:females = 1.2:1). The mean age of patients with UT calculi was 44 years, while that of LT calculi was 51 years.**

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## INTRODUCTION

Urinary calculus disease is a common problem encountered in clinical practice in Kelantan, the northernmost state on the east coast of Peninsular Malaysia. In our hospital it accounted for 12.4% of general surgical admissions over a two year period. In the only previously published study of the extent and distribution of calculus disease in the Peninsula, Screenevason[1] used the five yearly hospital returns to examine the admission rate. In the last period studied, 1972-1976, he found an incidence of 33.3 per 100,000 for UT calculi and 3.6 per 100,000 for LT calculi for Kelantan.

To establish some baseline epidemiological data on patients with urinary stones, we looked at the operative incidence over a two year period.

## MATERIALS AND METHODS

Surgery for urinary calculi is performed in only two hospitals in Kelantan, the General Hospital, Kota Bharu (GHKB) and the Hospital Universiti Sains Malaysia(HUSM) in Kudang Kerian. The surgical records of all patients who had undergone stone surgery in these two hospitals between June 1984 and May 1986 were examined retrospectively. Age, sex, race, address and site of stone were noted.

Using the population census of 1980, and calculating on a growth rate of 2.6%, an operative incidence was obtained. A conventional $X^2$ test was used to test the significance of the differences in racial and regional operative incidence.

**Department of Surgery, Hospital Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia**

K G Lim, MBChB, Medical Officer
R H Edward, FRCS, Lecturer
G L G McAll, MA, FRCS, Lecturer
M Thaung, MBBS, Medical Officer

**Department of Chemical Pathology, The Medical School Universiti Sains Malaysia, Minden, Penang, Malaysia**

N Wahab, MSc, Lecturer
G Arimainayagam, MD, Lecturer

**Correspondence to: Dr Lim**

## RESULTS

216 patients had surgery for their urinary calculi in Kelantan during the two year period; 136 in GHKB and 80 in HUSM. Table 1 shows the anatomical distribution of calculi encountered. 71 patients had UT stones and 143 had LT stones. Another 2 patients has a combination of an upper and a lower tract stone. The admission/operation ratio in HUSM was 7.4:1 for patients with UT stones, but 1:1 for those with LT stones. Multiple admissions were more common amongst patients with UT as opposed to LT stones.

The population of Kelantan (1985) was 1,010,444. The annual incidence of new patients undergoing stone surgery was therefore 10.1 per 100,000 residents. The rate for UT stones was 3.4 per 100,000 and 6.8 per 100,000 for LT stones. 11 patients from the neighbouring state of Terengganu and 2 patients resident for less than a year in Kelantan were excluded.

The mean age (+/− SD) of the patients with UT calculi was 43 (+/− 14) years for men and 45 (+/− 12) for women. Among patients with LT calculi the mean age (+/− SD) of the men was 52 (+/− 21) years, of the women it was 56 (+/− 17). Figure 1 shows the age distribution, and Figure 2 the age specific incidence, of patients with UT and LT calculi.

Of the 71 patients with UT calculi, 59 (83%) were Malay, 6 (8%) were Chinese, 4 (6%) were Thai and 2 (3%) were Indian (Table 2). The ratio of males to females was 1.7:1 among Malays. The 6 Chinese and 4 Thai were all women. The two Indians were both men. The overall ratio of males to females was thus 1.2:1.

Among the 143 patients with LT calculi, 139 (97%) were Malays, and of these 134 were men (male-female = 27:1). The 4 non-Malays consisted of 1 Chinese, 1 Thai and 2 Indians, all of whom were males, giving an overall male:female ratio of LT stones of 28:1.

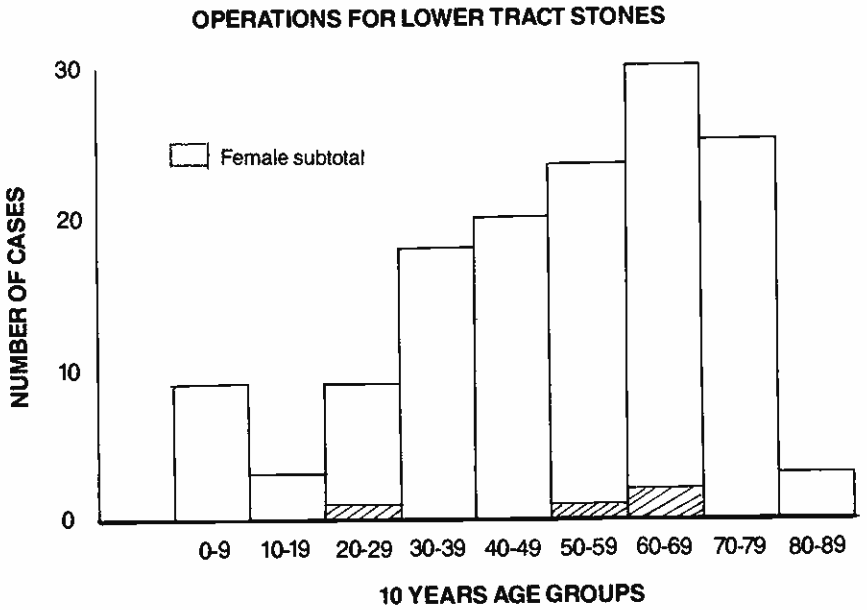
Kelantan has a racial composition of 92% Malays, 6% Chinese, 8% Indian and 1% others. Non-Malays were grouped together for statistical analysis because of their small numbers. Together they accounted for more UT stones than would be expected ($p < 0.02$). There were too few non-Malays with LT stones for statistical analysis.

Our examination of the geographical distribution of our patients within Kelantan is shown in Figure 3. For the purposes of statistical analysis, the 5 inland *jajahans* (administrative districts) of Kelantan were grouped together, because

Table 1
**ANATOMICAL DISTRIBUTION OF CALCULI**

| Single Site | No of | Multiple Sites | No of | Total |
|---|---|---|---|---|
| Kidney | 38 | Both kidneys | 3 | |
| Ureter | 26 | Kidney and same ureter | 1 | |
| | | Kidney and opposite ureter | 2 | |
| | | Both uterers | 1 | |
| UPPER TRACT | 64 | | 7 | 71 |
| | | Ureter and bladder | 2 | 2 |
| Bladder | 128 | | | |
| Urethra | 13 | Bladder and urethra | 2 | |
| LOWER TRACT | 141 | | 2 | 143 |
| | 205 | | 11 | 216 |

FIG 1 **AGE DISTRIBUTED OF PATIENT OPERATED FOR UROTHIASIS**



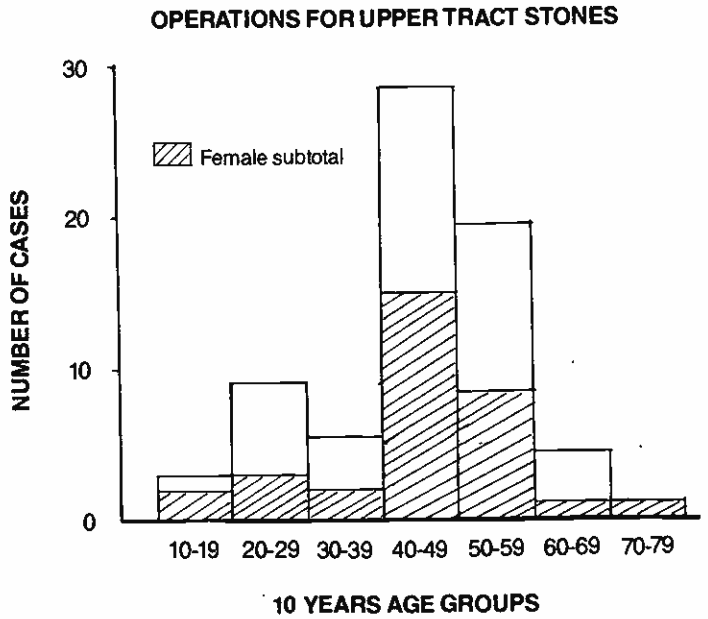



Table 2
**SEX AND ETHNIC DISTRIBUTION OF PATIENTS OPERATED FOR URINARY CALCULI**

| UPPER TRACT CALCULI | | | LOWER TRACT CALCULI | | |
|---|---|---|---|---|---|
| | Number of patients | | | Number of patients | |
| | Males | Females | | Males | Females |
| Malays | 37 | 22 | Malays | 137 | 5 |
| Chinese | 0 | 6 | Chinese | 1 | 0 |
| Thais | 0 | 4 | Thais | 1 | 0 |
| Indians | 2 | 0 | Indian | 2 | 0 |
| TOTAL | 39 | 32 | TOTAL | 138 | 5 |

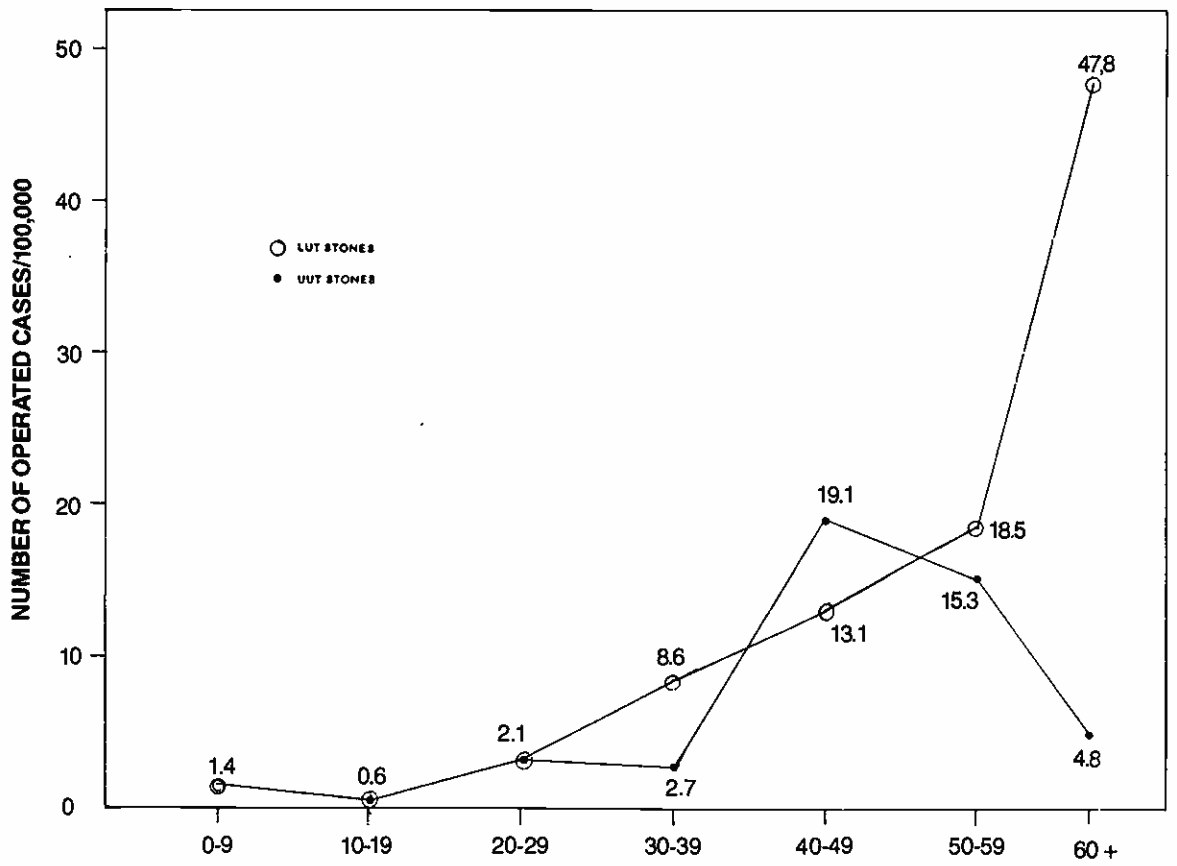
of the small number of patients within these jajahans. Similarly the two coastal *jajahans* of Bachok and Pasir Putih were combined. The operative incidence of UT calculi was significantly higher among residents of Kota Bharu *jajahan* than in residents of the other regions ($p < 0.05$). Kota Bahru *jajahan* includes the capital city of the state. The operative incidence of UT calculi was significantly lower in the 5 inland *jajahans* ($p < 0.05$). There was no significant difference in the incidence of operations for LT calculi by region ($p > 0.02$).

## DISCUSSION

Urinary calculi may remain asymptomatic and symptomatic patients may pass their stones spontaneously or resort to traditional or other forms of treatment. Hospital based studies on calculi therefore cannot assess the true incidence of calculus diseases.

Ljunghall et al.[2] have shown that renal stone disease is far more common than is evident from analysis of hospital

FIG 2 **AGE SPECIFIC INCIDENCE OF OPERATED UROLITHIASIS IN KELANTAN**



admission rates. However, most international epidemiologic information about urinary calculi has been obtained from hospital statistics. This approach is the most feasible to interested hospital based clinicians and within limitations provides useful information.

The same investigator (Ljunghall et al.[2] noted that in operated on because of stones. Surgery for calculi provides a very definite diagnosis of the disease, although factors other than the incidence of calculi, such as the uptake of surgery and the accessibility of hospital care, influence the rate of stone surgery.

UT stones are common in the industrialised countries. They are believed to affect about 1 per 1000 individuals annually.[3] In this cross-sectional study of operated calculi a rate of 0.034 per 1000, even though these are not admission rates, gives us a very low rate in Kelantan in comparison to the West. Our admission/operation ratios for UT as opposed to LT stones in HUSM may explain the difference between Sreenevason's figures[1] and ours. The slightly higher ratio of males to females is not unusual and the mean age of our patients follows fairly closely those of the West.

One century ago bladder stones were common in the West, especially among children[4] but are almost unknown in such countries today.[5] LT calculi, according to the current literature, are most common in the countries lying in a broad belt extending from North Africa, the Middle East, Pakistan, India, Southeast Asia to Indonesia.[6] They occur mainly in children under the age of ten years. Investigators in North and Northeast Thailand report hospitalisation rates of 15 or more per 100,000 residents annually in endemic areas and rates 10 to 100 times lower in non-endemic areas.[7]

In this series, with 135 patients with LT stones who were resident in Kelantan, we have an annual rate of 6.8 per 100,000 operated patients, which is comparable to the endemic areas of North and Northeast Thailand. Male/female ratios of as high as 36:1 have been reported[4] although the ratio of 28:1 noted here stands among the highest.

A more unusual feature in this series is the age distribution of our patients. 42% of these patients were above 60 years old, and in this age the incidence of operated LT calculi is 47.8 per 100,000. LT stones in the more developed countries are predominantly associated with outflow tract obstruction.[8] The extent of this association in our patients has been examined.[9]

Unlike paediatric bladder in Thailand[7] and West Sumatra,[10] we have not been able to show that our bladder stones orignate from the less urban regions.

With UT calculi however, we do observe a higher incidence in the more urban centre of Kota Bharu.

Operative records suggest that Kelantan has as unusual pattern of urolithiasis. Lower tract stones are common and

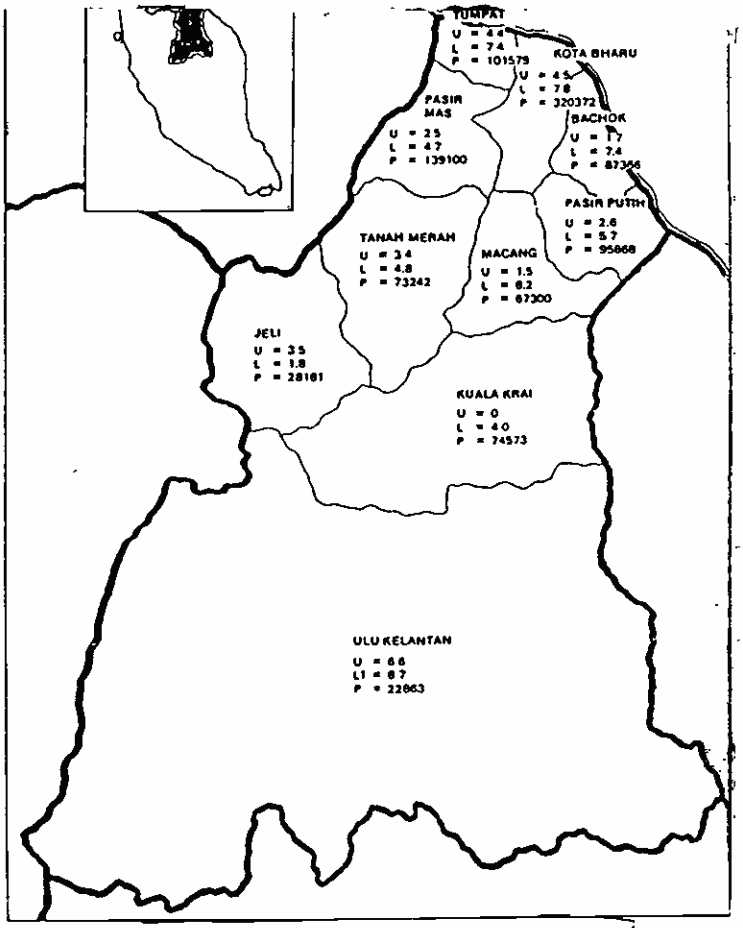



FIG 3 **INCIDENCE OF OPERATED UROLITHIASIS IN THE VARIOUS JAJAHANS OF KELANTAN.** U denotes incidences of upper urinary tract calculi, L denotes incidence of lower urinary tract calculi, P denotes population (1985).

are predominantly seen in elderly men. The incidence rises sharply above the age of 60 years. Many questions regarding the pathogenesis of such bladder stones remain to be answered.

## ACKNOWLEDGEMENTS

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