ANNUAL PROGRESS REPORT

SEATO Medic Study No. 101	Epidemiological Factors Related to Formation of Urinary Tract Calculi
Project No. 3A 025601 A 811	Military Medical Research Program S.E. Asia
Task 01:	Military Medical Research Program S.E. Asia
Subtask 01:	Military Medical Research Program SEASIA (Thailand)
Reporting Installation:	US Army-SEATO Medical Research Laboratory APO 146, San Francisco, California
	Division of Medical Research Laboratories
	Department of Virology (Special Project)
Period Covered by Report:	1 April 1963 to 31 March 1964
Principal Investigator:	Major Scott B. Halstead, MC
Associate Investigator:	Dr. Aree Valyasevi
Reports Control Symbol:	MEDDH-288
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ABSTRACT

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The objective of this study is to determine epidemiological factors related to formation of urinary tract calculi. Bladder stone is an acute and chronic disease occurring among the rural inhabitants of North and Northeast Thailand. In a survey conducted in 1963 in Ubol Province no inhabited area was found to be free of bladder stones; however, prevalence in urban areas was very low. Disease prevalence did not vary significantly with ethnic group, heredity or economic status. Symptoms begin most frequently during the hot, dry weather before and after the rainy season. Burning or painful urination, the passing of urinary sand or obstruction of urinary flow may be the only symptoms of the disease; and 8 persons have these lesser symptoms to every 1 person hospitalized. Spontaneous stone passing is three times as frequent as symptoms requiring operation. Stone passing and obstruction of GU tract occur primarily in males but the lesser symptoms

occur nearly as frequently in females as males. The disease is most prevalent in children under the age of 5, however, stone formation occurs at a significant rate throughout life. Stones recur in 8% of cases or 7 times as frequently as the original attack rate. Finally, persons who share the same food and household environment with positive cases are twice as likely to develop a stone as the average.

BODY OF REPORT

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Objective: The objective of this study is to determine epidemiological factors related to formation of urinary tract calculi particularly bladder stone.

Description: Bladder stone is the most common surgical problem in North and Northeast Thailand. The condition is considered by most authorities to be a nutritional disorder. In January, 1963 selected rural and urban areas of Ubol Province were surveyed for prevalence of bladder stone. Sample populations of 44 villages and 3 towns were selected randomly from village rosters. Interviewees were asked to recall whether they or any member of their family remembered history of: (1) stone operation (2) passing a stone per urethra (3) episode of sandy or cloudy urination (4) episode of dysuria

(5) episode of painful urination (6) hematuria. The first 2 occurrences are classified as positive episodes (of bladder stone disease) and the latter 4 episodes are classified as presumptive episodes.

Progress: Altogether, families representing 20,806 persons were interviewed. Of these, 15,154 lived in 44 villages and 5,654 persons lived in 3 towns with populations of 5,000 or greater. As seen in Table 57, of the persons interviewed 253, or 1.2% had either passed a stone or had an operation and 540 or 2.6% had had presumptive symptoms. For each person hospitalized there were 3 sufferers who passed calculi spontaneously without medical attention and 8 persons with presumptive symptoms.

Geographical Distribution

No area surveyed was free of stone disease. Stones were 4 times as prevalent among some persons who lived near the Maekong as in persons who were remote from large bodies of water. In general, however, stone prevalence assumed a somewhat random distribution within each area studied. Several adjacent villages were found to have high and low stone prevalence even though they shared water and sources of food.

Rural and Urban Prevalence

The prevalence of positive and presumptive symptoms of bladder stone among residents of towns was uniformly low compared with residents of surrounding villages. Only 0.25% of inhabitants of the town of Ubol had positive evidence of stones while stones occurred at rates which were average (1-2%) for the Province as a whole in each of surrounding suburban villages.

Season of Occurrence of Stone Episodes

Positive and presumptive episodes of bladder stone disease showed a bimodal seasonal variation. The highest incidence of stone passing and presumptive symptoms occurred before and after the rainy season in March and November.

Age of Onset

Bladder stone is a disease of all ages of life, with a marked tendency to involve the very young. The modal age of presumptive symptoms is 2 years while the model age of stone passing and operations is 3. Operations are performed rarely after childhood (confirmed by hospital statistics) but presumptive symptoms and stone passing episodes starting in the 3rd decade occur at a steady rate through life (about one half the rate observed in 3 year old).

Sex

Symptoms of bladder stone disease occur more frequently in males than females. Males accounted for 208 positive histories and females for 45 (4.6:1, M:F). Sex ratio for presumptive symptoms was 2:1 males to females while the ratio in hospitalized patients (Ubol Hospital 1958-1962) was 9:1 males to famales.

Ethnic Group

Bladder stone prevalence did not vary significantly with any of the major ethnic groups living in Ubol. Each of the ethnic groups sampled with large enough numbers had approximately the same incidence of stones as did the Lao-Thai people living in the same area (Table 58).

Duration and Recurrence of Bladder Stone Disease

Spontaneous passage of stone or acute urinary retention occurred abruptly without prodromal symptoms in over one-half of the positive group. The rest had fairly continuous presumptive symptoms which preceded operation or stone passing by an average of over 2 years. In contrast to bladder stone operations stone passing recurred relatively frequently. Twenty-one of 253 persons or 8% passed stones on two or more occasions. As is shown in Table 59, the average interval between these positive episodes was 9 years and 5 months with intervals as long as 35 years being recorded. Of 68 persons with stone operation, 2 had operative recurrence. The intervals between first and second operations were 6 and 51 months, respectively.

Family Prevalence

Bladder stone symptoms occurred more frequently among household relatives than among other relatives of persons with the disease. In Table 60 it is seen that the secondary prevalence rate for bladder stone among the household relatives of positive cases was twice as high as the over-all prevalence rate. However, secondary episodes among near relatives living in other household occurred only at the frequency of primary occurrences.

Economic Status

The prevalence of positive or presumptive symptoms of stones was not found to vary significantly with family or village economic status (see Table 61).

Summary and Conclusions: Bladder stone is an acute and chronic disease occurring among the rural inhabitants of North and Northeast Thailand. In a survey conducted in 1963 in Ubol Province no inhabited area was found to be free of bladder stones; however, prevalence in urban areas was very low. Disease prevalence did not vary significantly with ethnic group, heredity or economic status. Symptoms begin most frequently during the hot, dry weather before and after the rainy season. Burning or painful urination, the passing of urinary sand or obstruction of urinary flow may be the only symptoms of the disease; and 8 persons have these lesser symptoms to every 1 person hospitalized. Spontaneous stone passing is three times as frequent as symptoms requiring operation. Stone passing and obstruction of the GU tract occur primarily in males but the lesser symptoms occur nearly as frequently as the orginal attack rate. Finally, persons who share the same food and household environment with positive cases are twice as likely to develop a stone as the average.

Table 57. Prevalence of positive episodes and presumptive symptoms in sample. Ubol, January 1963.

Total Interviewed		20,806
Total positive cases		253
Passed stone only	185	
Stone passed and operation	41	
Operation only	27	
Two operations	2	
Total presumptive cases		540

Table 58. Prevalence of positive bladder stone episodes in several ethnic groups. Ubol, 1963.

Ethnic group	Number sampled	Positive episodes	Attack rate per 1000	Attack rate per 1000 Lao-Thai in same area
Chinese	595	2	3.4	4.9
Vietnamese	447	1	2.2	3.8
Cambodian	949	5	5.3	7.0

Table 59. Duration and recurrence of bladder stone disease, Ubol, 1963.

	Number Cases	Average duration or interval	Extremes
Abrupt onset of positive symptoms	136	--	--
Presumptive symptoms precede positive	114	2.3 years	2 wks.- 36 yrs
Stone passing recurrence	21	9.4 years	5 mos.- 34 yrs

Table 60. Familial prevalence of bladder stone, Ubol, 1963.

	Total study	Near relatives of primary cases	
		Same household	Different household
No. at risk	20,806	1,348	3,105
Positive occurrence	253	31	43
Prevalence	1.2% (primary attack rate)	2.3% (secondary attack rate)	1.4% (secondary attack rate)

Table 61. Bladder stone prevalence and economic status of lifelong village residents, Ubol, 1963.

	Economic Rating by Village Headman					
	Poor	%	Average	%	Good	%
All families	930	38.9	1,328	56.5	135	5.6
Positive episodes	78	37.9	111	53.9	17	8.2
Presumptive symptoms	168	34.5	299	61.4	20	4.1

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