

# TYPES OF GALL STONES FOUND IN A SRI LANKAN COMMUNITY

H.T.W. Weerakoon<sup>1</sup>, J.G.S. Ranasinghe<sup>2</sup>, K.B. Galketiya<sup>3</sup>, S. Rosairo<sup>3</sup>, R. Sivakanesan<sup>2</sup> and A. Navarathne<sup>4</sup>

*Department of Biochemistry, Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka, <sup>2</sup> Department of Biochemistry and <sup>3</sup> Department of Surgery, Faculty of Medicine, University of Peradeniya, <sup>4</sup> Department of Chemistry, Faculty of Science, University of Peradeniya, Peradeniya.*

Gall stones (GS) are formed in the gall bladder and biliary tract, from the constituents of bile namely, cholesterol and calcium salts (calcium bilirubinate, calcium fatty acids and calcium phosphate). The proportion of these chemical compounds in bile, determines the GS type. The two types of GS are cholesterol and pigment stones. The best method to identify the chemical composition is through quantitative analysis of main chemical constituents of the GS. However, it can also be assessed by the analysis of external and cross sectional morphological features<sup>1</sup>. The chemical composition of the bile is influenced by multiple genetic and environmental risk factors. These risk factors have geographical and ethnic variations<sup>2</sup>. Hence the identification of chemical composition in different types of GS in different communities is operative in detecting the pathogenicity and risk factors. The objectives of this study were to identify the chemical composition of different types of GS in a Sri Lankan community and to describe the possible epidemiological factors.

The study was carried out from May, 2011 to October, 2012. Data and sample collection was done at Teaching Hospital Peradeniya (THP). Adult patients (> 18 years) residing in Kandy District for more than 5 years admitted surgical unit, THP for GS removal surgery were included in the study. General and clinical details including age, gender and ethnicity of each patient were recorded using an interviewer administered questionnaire and the GS were collected at the time of the surgery. GS were washed and preserved for further analysis. External and the cross sectional morphology of each GS was recorded according to the criteria given by the GS research committee of Japanese society of gastroenterology<sup>1</sup>.

**Table 1: Classification of GS by external and cross sectional morphology<sup>1</sup>**

Type of GS	Subgroup	External appearance	Cross-sectional appearance
Cholesterol GS	Pure cholesterol	Oval to round White yellow	Radially arranged cholesterol crystals from center to periphery
	Combination	Oval or round Brownish dark brown	Pigmented outer layer and cholesterol inner layer or vice versa

	Mixed	Round to faceted Yellowish white, yellowish brown, greenish brown or black brown	Blend of a concentric and radial shape mixing cholesterol and pigment through out the layers
Pigment GS	Black	Black in colour	Amorphous
	Brown	Brown in colour	Concentric layers

Gall stones, which could not be categorized into any of the above groups were categorized as rare stones. GS from 92 patients were analyzed. Of the total number of patients, 68 (74%) were females (with male:female ratio of 1:3). Mean age at presentation of the total group was 46 (SD, 11) years and the mean ages of gender groups were; females 44 (SD, 11) and males 53 (SD, 12) years. A significant difference was noted between males and females with regards to the age of presentation ( $p = 0.002$ ;  $\alpha, 0.05$ ). Of the total, 73 (79%) were Sinhalese, 13 (14%) were Muslims and 06 (7%) were Tamils.

In the analysis of different types of GS, 51 (55%) were pigment stones (black pigment 47, brown pigment 04) and 40 (44%) had cholesterol stones (pure cholesterol 3, combination 06, mixed - 31). Only one had a rare stone. There was no significant difference between the incidences of the two main groups of GS ( $p = 0.1$  &  $0.05$ ). The mean age of presentation with pigment stones was 47 (SD, 12) years and that of the cholesterol stones was 45 (SD, 11) years. These differences were not significant ( $p = 0.397$ ; &  $0.05$ ). The incidence of GS in relation to gender and ethnicity is shown in the table 2.

Symptomatic GS are three fold common in females than in males. However compared to females, males present in more advanced age with symptomatic GS. Age and gender distribution of symptomatic GS is compatible with the distribution of GS disease in the globe<sup>2</sup>. Even though pigment stones are identified as the predominant type of GS among most of the Asian populations<sup>2</sup>, both pigment and cholesterol stones were found in almost equal frequencies in our study.

Out of the pigment stones, brown pigment stones which occur due to biliary tract infection have been identified as the most prevalent type of GS in most of the Asian countries and in contrast black pigment and mixed cholesterol stones were predominantly noted in this community. Hence, it is important to ascertain the pathogenicity of black pigment and mixed stones in this community to determine possible risk factors and to reduce the occurrence of symptomatic GS.

## REFERENCES

1. In SK, Seung JM, Sang SL, Sung K, Myung HK. Classification and nomenclature of gall stones revisited. *Yonsei Medical Journal* 2003; 44(4): 561-570.
2. Shaffer E. Epidemiology of gall bladder stone disease. *Best practice and research clinical gastroenterology* 2006; 20 (6): 981-996.