Composition of gallstones in Coimbatore District of Tamil Nadu State

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Background: Gallstones in northern India are predominantly of the cholesterol type; such information on gallstones in southern India is scant. Aim: To analyze the composition of gallstones from patients residing in Coimbatore District in Tamil Nadu State. Methods: The stones were classified using the Bernhardt criteria and was correlated with the morphological characteristics. Results: Of the 105 gallstones analyzed, 67 (63.8%) were of the pigment variety and 36 (34.8%) of the intermediate/mixed type. There were only two cholesterol stones. The mean proportions of cholesterol, bilirubin and calcium in the pigment and intermediate stones were 7.1%, 26.1% and 7.8% and 30.2%, 18.4% and 6.3%, respectively. The mean proportion of bilirubin in the pigment stones was higher than in the intermediate type. Morphologically, pigment stones were black in 55% and amorphous in 45%; the intermediate stones were hard in 50% and of variegated color ranging from yellow to ivory white in 61%; both cholesterol stones were multiple, hard and brown. Conclusion: There is a predominance of pigment and intermediate gallstones (98%) in this district. These stones have reduced cholesterol and an increase in bilirubin and calcium proportions. [Indian J Gastroenterol 1998; 17: 134-135]

Key words: Epidemiology

In northern India cholesterol gallstones predominate among women. Reports on the nature of gallstones in southern India are few. A recent retrospective, hospital-based study from Chennai, 77% of gallstones were of pigment type, 17% of intermediate type and 6% of cholesterol type. This pilot report was based on visual inspection alone, and not on biochemical analysis. This prompted us to undertake a study of gallstone composition in a large city (Coimbatore) of Tamil Nadu State.

Methods

Between July 1994 and March 1996, gallstones obtained from 105 consecutive patients residing in Coimbatore who underwent cholecystectomy were analyzed for their biochemical composition retrospectively. Data on risk factors other than age and sex were not available.

The cholesterol, bilirubin and calcium contents of the gallstones were assayed by standard methods.

Gallstones were defined as cholesterol type when the cholesterol proportion exceeded 50%, as intermediate/mixed when it was 20% to 50%, and as pigment gallstones when the proportion was less than 20%. Visual appearance of the stones was compared with the biochemical findings.

Statistical analysis

Student's t test for unpaired data was used to compare the proportions of the constituents in the three types of stones.

Results

The 105 patients included 47 men and 58 women, with mean (SD) age of 50 (16.5) years. There was no difference in age and gender distribution among patients with the three types of gallstones. The 67 patients (31 men) with pigment gallstones included 18 (26.9%) aged less than 40 years, 20 (29.9%) aged 40-59 years and 29 (43.2%) aged 60 years or above. The 36 patients (15 men) with intermediate type included 14 (36.8%), 12 (33.3%) and 10 (27.8%) in these age groups, respectively. Of two patients with cholesterol gallstones (2.4%), one was a man aged 43 years and the other a woman aged 50 years.

The mean weight and the composition of the three types of stones are shown in the Table. Calcium levels were higher in pigment stones than in cholesterol stones, whereas mean bilirubin proportions were similar. There was no difference in the constituents of the pigment and intermediate type of gallstones in the various age and sex groups, except in patients aged <40 years with pigment gallstones who had mean high proportion of bilirubin (36.2%) versus 22.2% and 22.5% in the other age groups; p<0.01).

Morphologic characteristics

The pigment gallstones were multiple in 56 (84%) pa-
patients. The stones were black in 37 (55%), brown in 14 (21%) and neither brown nor black in 16 (24%). Sixty-three per cent of these gallstones were amorphous and 19% were soft; the rest were hard. The intermediate gallstones were multiple, hard and faceted in 18 (50%), amorphous in 11 (31%) and soft in 7 (19%). They were black in 8 (22%), brown in 6 (17%), or grey, green, yellow (i.e., nonbrown, nonblack) in 22 (61%). Both the cholesterol gallstones were multiple, brown and hard.

Discussion

Most reports on biochemical composition of gallstones in India are from the northern part of the country. Eighty percent of gallstones from Delhi 1,2 and Uttar Pradesh 5 belonged to the cholesterol variety. Similar findings have been reported from Kashmir 6 and from Lucknow. 16 In Rajasthan, cholesterol gallstones were dominant (95%) and no pigment gallstones were reported. 10 In a recent series from Sikkim and north Bengal, Kotwal et al 17 reported no pigment gallstones. Rajagopal et al 18 from Mumbai reported dark black gallstones in the gallbladder.

The present study from Tamil Nadu confirms our earlier observation 6,10 that pigment gallstones are the dominant type in this region. Rathihasamy et al 19 had shown by X-ray diffraction studies that a major proportion of gallstones in southern India consisted of calcium carbonate and calcium palmitate with trace amounts of cholesterol. Ananthakrishnan et al 19 reported that 50% of gallstones from southern India had pigment in traces. They reported a case of pure aragonite stone. 19 Vihthut et al 20 from Kerala compared common bile duct stones from northern and southern India by X-ray diffraction and concluded that the latter had higher amounts of calcium palmitate, aragonite and an amorphous material whereas the former consisted of anhydrous and monohydrate forms of cholesterol.

Pigment stones are predominantly black and amorphous and intermediate stones hard, multiple and of different colors. The two cholesterol stones were multiple, hard and brown, quite unlike the usual description of a white cholesterol gallstone. These stones had shades and morphological characteristics of intermediate gallstones with borderline increase in their cholesterol levels.

To conclude, we have biochemically confirmed the predominance of the pigment variety of gallstones in Tamil Nadu and highlighted their differences in morphological characteristics. It would be worthwhile to obtain concurrent epidemiological and biochemical characteristics of gallstones in south Indian patients.

References