



A Rare Case of Multiple Amorphous Crystalline Stones in Gallbladder in Patient of Grade II Acute Cholecystitis

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Abstract:

In gallbladder, stones mainly found are cholesterol, pigment and mixed stones. These stones are either yellow, brown, black or mixed colour stones. According to literature review, amongst mixed stones, commonest stones according to chemical composition is bilirubinate-calcium carbonate stones, accounting for one third of cases around 34.1%. Gallstones can have various combination of salts mixed with it, like calcium, phosphorous, carbonates, bilirubinate etc. We report a rare type of gallstone, found in 50 year old patient of acute cholecystitis grade II, where intra operative glass like crystalline stones were seen in gall bladder and post-operative biochemical gallstone analysis showed cholesterol oxidase-peroxidase test and fiske subbarow test positive; indicating presence of cholesterol-phosphate combination of stones; which itself has incidence of only 3.1% in literature. Hence composition of stone should always be analysed if possible, as it gives adequate idea regarding underlying cause or identifying rarity of stone.

Keywords: crystalline gallstones, cholecystitis, cholesterol phosphate stones, cholesterol oxidase-peroxidase test, fiske subbarow test.

INTRODUCTION:

A 50-year male patient came in our casualty with abdominal pain, fever, nausea, vomiting from 2 days. Patient is a known case of diabetes mellitus, hypertension and is chronic alcoholic from last 20 years. No other co morbidity was present. On general examination, patient was well built & nourished. Marked severe dehydration was noted. Patient was tachycardic (pulse rate 108/min), hypertensive (bp 180/100 mmhg), tachypnic (respiratory rate 22/min) and febrile (temperature 99.6°f). On abdomen examination, severe tenderness was present over right hypochondrium with guarding & positive murphy's sign. No evidence of free fluid, mass, or hepato-splenomegaly was noted.

Investigations:

- Hematological investigations showed leucocytosis (16,700 cells/cmm) & raised renal parameters (urea-61 & creatinine-1.9). Random blood sugar was 524mg/dl and urine routine showed glucose +3. Liver function test, bleeding time, clotting time, pt-inr were in normal range.
- Usg abdomen & pelvis showed distended gall bladder with sludge and multiple calculi.
- X-ray abdomen showed gas filled bowel loops.
- OGD-scopy showed GERD.

Hence according to Tokyo consensus classification final diagnosis was made as grade II acute cholecystitis (2).

Patient was stabilized and laparoscopic cholecystectomy was performed. Intraoperative fluid collection around gall bladder noted. Gall bladder

was walled off by omentum. Gangrenous gallbladder wall with impending perforation seen & frozen calot's triangle was noted. While dissection, gall bladder got perforated & multiple amorphous glistening, glasslike crystalline stones noted. (fig. 1a & 1b).

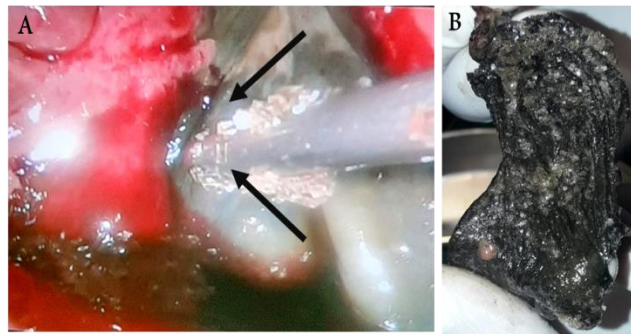


Figure 1. A: Intraoperative finding in laparoscopic cholecystectomy. Arrow shows multiple crystalline gall stones. B. Specimen of gangrenous gall-bladder with multiple crystalline stones adhered on gall bladder wall.

Stones were send for analysis in our biochemistry department. Cholesterol oxidase-peroxidase test (3) and fiskesubarow test(4) were positive; indicating presence of cholesterol-phosphate stones. Microscopy showed rhomboid to rectangular stones

with notched borders. (fig 2a, 2b, 2c). Biochemical test for uric acid, calcium carbonate, magnesium, ammonia & cystine test were negative on crystalline stones.

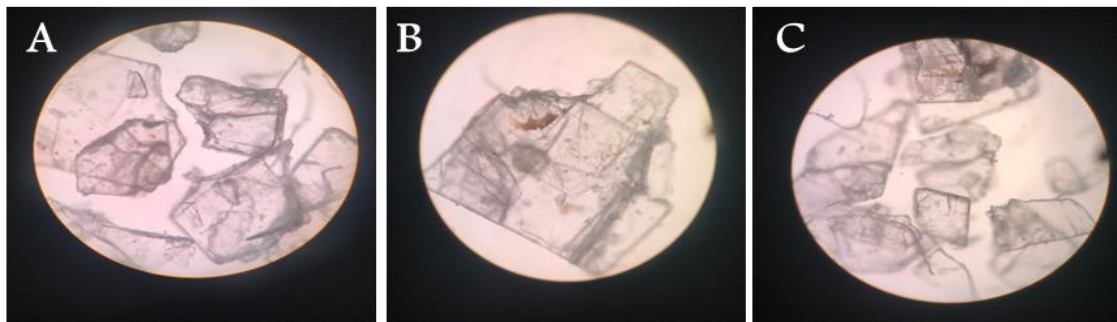


Figure 2(a, b,c): Microscopic examination of crystalline stones showing amorphous rhomboid to rectangular stones with notched borders.

Discussion:

- Cholelithiasis is the most common surgical disease encountered in day-to-day practice. It can either present as acute calculus cholecystitis, chronic calculus cholecystitis or sometimes presents in asymptomatic patients as an incidental finding in abdominal scans.
- The types of stones found in gallbladder is useful in understanding the underlying cause. For example, cholesterol stones indicate supersaturation of bile by cholesterol seen in patients eating high caloric diet, usage of drugs like oral contraceptives, obesity. Brown pigment stones indicates bile stasis, also associated with the presence of foreign bodies within the bile ducts such as endoprostheses (stents) or parasites such as clonorchis sinensis and ascaris lumbricoides. Recently bactibilia is also associated with gall stones. Black stones are associated with hereditary spherocytosis or sickle cell disease and also in patients of cirrhosis.
- Crystalline gall stones are also mentioned in literature by patients on chenodeoxycholic acids where in vivo stones break and forms crystal nidus. (5)
- Sometimes biliary sludge and cholesterol microlithiasis are also a cause of gall stone formation. (6)
- The traditional classification scheme classified gallstones into 3 types according to cholesterol content, including cholesterol stone (cholesterol content $\geq 70\%$), pigment stone (cholesterol content $\leq 30\%$) and mixed stone ($30\% \leq$ cholesterol content $\leq 70\%$) (8). Professor fu et al divided gallstones into 8 types according to the profile structure and chemical components. These included radial, radial annual ring-like, rock strata-like stromatolite, cast amorphous, sand bed-like stromatolite, silt-like, black, and complex stones (9). With the application of infrared spectroscopy other rare stones (including calcium carbonate, calcium phosphate, and fatty acid calcium stones) [10,11].can be identified. Using FTIR spectroscopy,

scanning electron microscopy and x-ray energy spectrometer and classifying gallstones according to the appearance, profile structure, component content and distribution, microstructure, elemental composition and distribution, the new systemic classification for gall stones was made and is mentioned in literature (1). The new systemic classification has more than 8 types and more than 10 subtypes of gall stones. According to the literature and new systemic classification, the incidence of cholesterol phosphate stones found in our patient, is only 3.1%. In our patient, we used biochemical tests and microscopy to know the presence of cholesterol and phosphate, which can be further evaluated for more subtype by spectroscopic methods (7). The only limitation for our case is to not identify more subtype of crystalline stones, due to unavailability of spectroscopic method and hence further evaluation was not done.

Conclusion:

Gall stones can be of multiple types and to know the origin, type, composition and microstructure, gall stone analysis can be done either by biochemical methods, microscopy or spectroscopic methods to know underlying cause & identifying rarity of stone.

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