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# Should we redefine large common bile duct stone?

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## Abstract

The definition of large stones is not clear ranging from 10 mm to 15 mm and does not include the lower common bile duct (CBD) diameter. Three hundred and four patients who underwent endoscopic retrograde cholangiopancreatography and stone extraction were retrospectively analyzed over a 1-year period. Sixteen patients were different from others in that 10 patients with large stones had stone extraction with a wire basket or a balloon catheter and 6 patients with small stones had stone extraction with mechanical lithotripsy. The definition of large stones should include diameter of the lower CBD and any stone exceeding 2 mm than the lower CBD diameter should be called large stone irrespective of the size of the stone.



**Key words:** Large common bile duct stone; Definition

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## LETTER TO THE EDITOR

We read with great interest in the article "Small sphincterotomy combined with papillary dilation with large balloon permits retrieval of large stones without mechanical lithotripsy" by Minami *et al* in *World journal of Gastroenterology* published in April 21, 2007[1]. We agree that the size and number of common bile duct (CBD) stones are still a concern in endoscopic sphincterotomy (ES). Balloon dilatation is not suitable for removal of large stones (> 1 cm in diameter) without sphincterotomy[2]. The successful removal of a CBD stone with a maximal diameter with conventional methods depends on the diameter of the distal CBD and the size of the sphincterotomy[3]. In general, common bile duct stones smaller than 1 cm in diameter may be extracted after sphincterotomy using retrieval balloons or baskets, whereas most of the larger stones require lithotripsy prior to their removal. The definition of large stones is not clear ranging from 10 mm to 15 mm[4] and does not include the lower CBD diameter[3].

We retrospectively analyzed patients admitted to our gastroenterology ward in SMS Hospital, Jaipur, between June 2006 and June 2007 who underwent endoscopic retrograde cholangiopancreatography (ERCP) for CBD stones (Table 1). Out of the 304 patients who underwent ES and stone extraction, 16 were different from others in that 10 patients with large stones had stone extraction with a wire basket or a balloon catheter and 6 with small stones had stone extraction with mechanical lithotripsy. The CBD stones were classified into 2 groups according to their size, lower CBD diameter and possible extraction with a wire basket, occlusion balloon or need for mechanical lithotripsy. The patients were divided into two groups: group A with their CBD stones > 10 mm in maximum diameter[2] and dilated CBD, group B with their CBD stones < 10 mm in diameter and their lower CBD diameter being 2-4 mm. We excluded patients with longitudinal stones (longest dimension in the axis of CBD) with their transverse diameter within 3 mm of the lower CBD diameter. All patients underwent ES with their CBD stones extracted using a wire basket or an occlusion balloon. The size of CBD stones was measured by comparing the diameter of the stones with the tip of endoscope, as on the cholangiogram. CBD stones were found in 16 patients with a male: female ratio of 5:11 with a mean age 42.8 years (range 27-58 years). Sixteen patients had abdominal pain, 14 had jaundice, and 5 had cholangitis.

The first group consisted of 10 patients (4 males, 6 females) with a mean age of 44.4 years (range 34-58 years). The median CBD stone diameter was 15.5 mm (range 15-20 mm), the median lower CBD diameter was 16 mm (range 13-24 mm). Eight patients had abdominal pain, 8 had jaundice and 2 had cholangitis. No patient had periampullary diverticula. All patients underwent successful stone removal with a wire basket after undergoing ES. A repeat cholangiography showed no residual stone in the CBD. There was no post procedure complication.

The second group was comprised of 6 patients (2 males, 4 females), with a mean age of 40 years (range 27-48 years).

**Table 1 Clinical features, endoscopic retrograde cholangiopancreatography findings and management of common bile duct stone**

| Number of patients | Age (yr) | Sex | CBD diameter (mm) | Lower CBD diameter (mm) | Abdominal pain | Jaundice | cholangitis | Management |
|---|---|---|---|---|---|---|---|---|
| 1 | 37 | M | 15 | 16 | + | + | - | Stone extraction with basket |
| 2 | 52 | F | 20 | 24 | + | - | - | Stone extraction with basket |
| 3 | 42 | F | 16 | 18 | + | + | + | Stone extraction with basket |
| 4 | 58 | M | 18 | 15 | + | + | - | Stone extraction with basket |
| 5 | 46 | M | 15 | 13 | + | + | - | Stone extraction with basket |
| 6 | 34 | F | 14 | 16 | + | + | - | Stone extraction with basket |
| 7 | 40 | F | 15 | 18 | + | + | - | Stone extraction with basket |
| 8 | 54 | M | 17 | 20 | + | - | - | Stone extraction with basket |
| 9 | 50 | F | 18 | 22 | + | + | + | Stone extraction with basket |
| 10 | 33 | F | 13 | 14 | + | + | - | Stone extraction with basket |
| 11 | 27 | F | 8 | 3 | + | + | + | Biliary stent followed by mechanical lithotripsy |
| 12 | 41 | M | 8 | 3 | + | + | + | Biliary stent followed by mechanical lithotripsy |
| 13 | 46 | F | 8 | 4 | + | + | - | Mechanical lithotripsy |
| 14 | 42 | F | 7 | 3 | + | + | + | Biliary stent followed by mechanical lithotripsy |
| 15 | 35 | F | 8 | 3 | + | + | - | Mechanical lithotripsy |
| 16 | 48 | F | 9 | 3 | + | + | - | Biliary stent followed by mechanical lithotripsy |

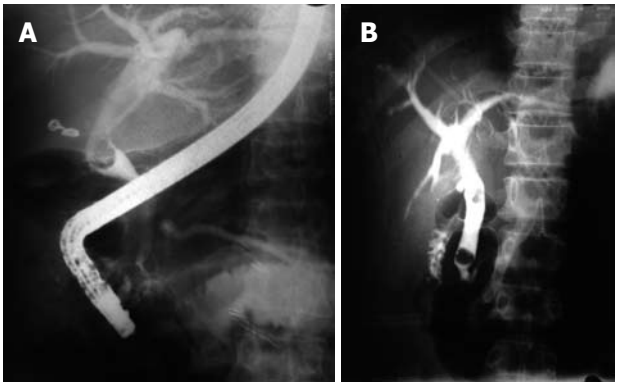


**Figure 1** Cholangiogram showing a 8 mm common bile duct (CBD) calculus and a 4 mm lower CBD diameter and intrahepatic biliary radical dilation (**A**), and a 9mm CBD calculus and a 3 mm lower CBD diameter and intrahepatic biliary radicals dilation (**B**).

Six patients had abdominal pain and jaundice, 3 patients had cholangitis. The median CBD stone diameter was 8 mm (range 7-9 mm), the median lower CBD diameter was 3 mm (range 3-4 mm) and all patients had a single stone (Figure 1). No CBD stones were found in any of the patients due to the smaller diameter of the lower CBD. A 7F double pig tail biliary stent was placed followed by mechanical lithotripsy ($n$ = 4) or mechanical lithotripsy ($n$ = 2). One patient had mild post-ERCP pancreatitis which was recovered in 3 d.

In the first group, the overall successful bile duct stone retrieval rate was 100% in the dilated lower CBD. Each patient required one session of ERCP since all of our patients had a single CBD stone.

In the second group, we were not able to remove the CBD stones as their size was disproportionate to the lower CBD diameter. The CBD is a pliable structure but dilates gradually. This is why obstruction occurs even after impaction of stones in lower CBD dilatation. Acute dilatation can only occur after balloon dilatation where the force is transmitted from inside to outward rapidly over a considerable length of the duct, while in removal of CBD stones, the force is exerted on CBD from downward. So, expansion is not expected and will result in injury or avulsion of the CBD and excessive force should not be applied to the stone.

Possible benign stricture was ruled out in all the 6 patients in the second group based on the following points. (a) The patients were asymptomatic with no recurrence of CBD stones during a mean follow-up period of 10 mo (range 6-15 mo). (b) The serum alkaline phosphatase was normal in all the six patients. (c) The common bile duct diameter was normal. Jakobs *et al*[5] reported that patients with a bile duct stenosis have a significantly elevated risk for stone recurrence. This might be explained by bile stasis proximal to the lesion, favoring stone formation. In our study, none of the patients had bile duct stenosis.

In conclusion, the definition of large stones should include diameter of the lower CBD and any stone exceeding 2 mm than the lower CBD diameter should be called large stone irrespective of the size of the stone.

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