*Case reports*

Surgical Endoscopy

Surg Endosc (1994) 8: 884–886



# Laparoscopic fenestration of a giant simple hepatic cyst

## Case report and technical considerations

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Received: 17 March 1993/Accepted: 11 June 1993

**Abstract.** The management of symptomatic large, simple hepatic cysts has evolved toward the use of wide unroofing or "fenestration" in instances where patients are not rendered asymptomatic by percutaneous aspiration. We report adoption of the technique of fenestration of such hepatic cysts to the laparoscopic route. Laparoscopic fenestration appears able to accomplish all of the aims of transabdominal fenestration in appropriately selected patients.

**Key words:** Hepatic cysts – Laparoscopic surgery

Congenital, simple, hepatic cysts are most frequently small and asymptomatic, but when they achieve substantial size they may become symptomatic and require drainage. When the diagnosis of a simple cyst is established, the initial treatment frequently consists of a therapeutic aspiration under CT or ultrasound guidance [4]. Aspiration affords a period of relief from symptoms as well as allowing chemical, cytologic, and bacteriologic analysis of the cyst fluid. Unfortunately, hepatic cysts uniformly recur after simple aspiration [5, 6] and thus, if symptomatic, they eventually require definitive treatment.

Enucleation, resection, and Roux-en-Y cyst jejunostomy all have been proposed to drain large, simple hepatic cysts [6], but excellent results have also been achieved using the simpler technique of wide unroofing, or fenestration. This procedure provides direct drainage of the cyst fluid into the peritoneal cavity and has been shown to be a successful and durable treatment [1–3]. Because of the simplicity of fenestration and recent improvements in laparoscopic techniques, we reasoned that it should be possible to perform this less morbid definitive therapy via the laparoscopic route.

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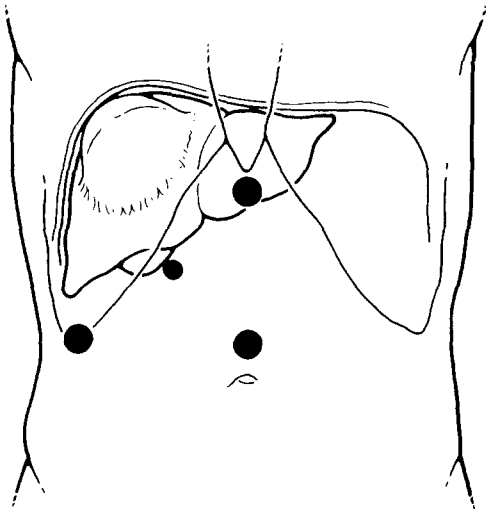
### Case report

A 51-year-old female presented with complaints of early satiety and occasional right upper quadrant abdominal pain since childhood. She was found to have a hepatomegaly on physical examination. CT scan demonstrated a 15-cm simple hepatic cyst. No evidence of parasitic disease was found. Aspiration of the cyst yielded 1,100 ml of "dishwater" fluid with a bilirubin of 3 mg per deciliter. Over the course of the next several months, the patient's mass and symptoms recurred and she once more underwent therapeutic aspiration. When the cyst subsequently recurred again, the patient requested definitive treatment and was referred for surgical intervention. The patient was thought an appropriate candidate for cyst fenestration, and it was decided to approach the lesion via the laparoscopic route.

### Technique

With the patient under general endotracheal anesthesia, nasogastric and urinary bladder catheters were passed. A Verres needle was introduced into the abdomen and a pneumoperitoneum was created. Three 12-ml ports and one 5-ml port were placed as shown in Fig. 1. Initially, the laparoscope was introduced via the umbilical port. Subsequently, 12-mm subxiphoid and right subcostal anterior axillary line ports were formed for placement of dissection instruments. The patient was placed in a steep reverse Trendelenburg position and rotated to the left. A 5-ml port was placed in the right subcostal midclavicular line. With the patient thus prepared, the camera was advanced along the anterior abdominal wall and the cyst was visualized. The cyst was partially adherent to the diaphragm where prior percutaneous aspirations had been performed. Using a rake retractor placed in the lateral subcostal port and a dissector in the subxiphoid port, the cyst was dissected free from the diaphragm until a generous area of cyst dome was visualized.

Using cautery, the dome of the cyst was opened where it appeared most attenuated, and the cyst was aspirated using the suction-irrigation device. At this time the wall of the deflated cyst was grasped from the lateral and subxiphoid ports and held taut while cautery



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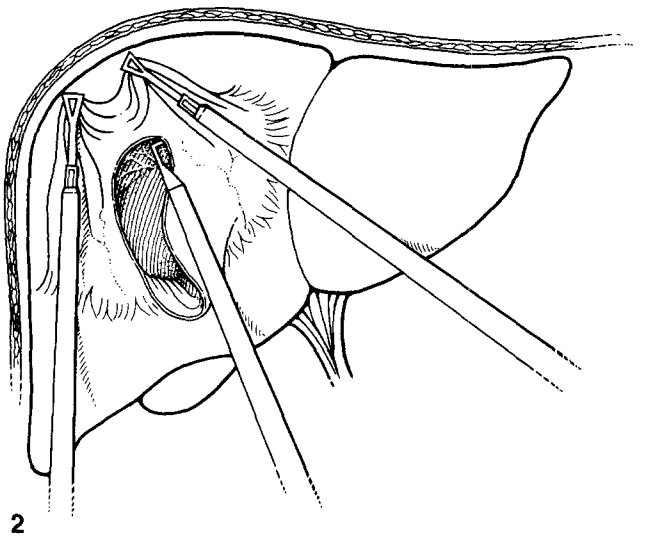

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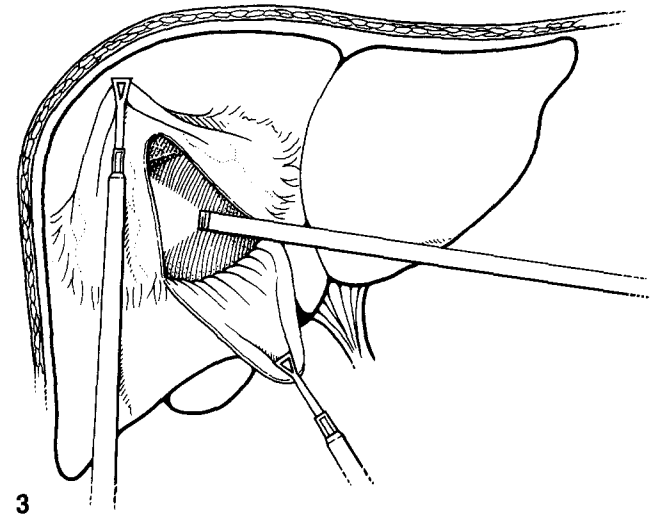

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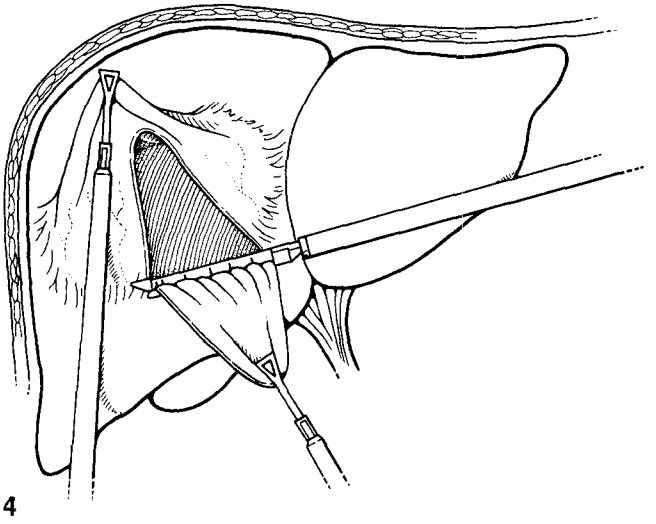

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**Fig. 1.** Port placement in a 52-year-old female presenting with right upper quadrant symptoms since childhood. A 1,200-ml simple cyst had recurred twice after CT-guided aspirations

**Fig. 2.** After aspiration, cautery is used to incise an anteriorly based window in the cyst

**Fig. 3.** The laparoscope is moved to the epigastric and then the lateral subcostal ports to ensure complete visualization of the cyst interior

**Fig. 4.** The base of the window is transected using a stapling device

was used (Fig. 2) from the midclavicular port to incise a flap in the cyst wall. Subsequently, the interior of the cyst was inspected by moving the camera from the umbilical port first to the subxiphoid port and subsequently to the lateral subcostal port. Traction maintained on the cyst wall flap via the umbilical port facilitates the inspection (Fig. 3). No papillary excrescences or evidence of bile leakage into the cyst cavity was found.

After returning the laparoscope to the umbilical port, the flap of the cyst wall was divided at its base where the cyst emerged from the liver substance anteriorly. Some bleeding from adherent hepatic parenchyma was encountered and was poorly controlled by cautery. The remaining pedicle of cyst wall with attached parenchyma was therefore transected using an endoscopic stapling device. This achieved complete hemostasis (Fig. 4). The transected cyst wall was removed via the epigastric port and sent for pathologic evaluation. After irrigation of the abdomen and release of the pneumoperitoneum, closure of the portals was performed in routine fashion. The patient was fed on the morning after surgery and discharged from the hospital that afternoon. Five months postoperative she is asymptomatic and follow-up studies show progressive resolution of the cavity.

## Discussion

Fenestration appears to be the operative treatment of choice for symptomatic simple hepatic cysts. Satisfactory performance of fenestration requires first that the portion of cyst wall excised be large enough to allow free exit of fluid from the cyst into the peritoneal cavity where it will be resorbed. Also, the excision should be large enough as to make reclosure unlikely. Second, it must be possible to inspect and biopsy the cyst interior to rule out neoplasia. Third, the cyst must be inspected for the presence of small biliary radicals emptying into it, and these should be able to be controlled. Lastly, it should be possible to assure hemostasis on the cut edge of the cyst. All of these aims appear achievable using laparoscopic techniques.

We found that simple cautery suffices to excise the attenuated portion of the dome, but an endostapling

technique was useful where the wall of the cyst is overlaid by parenchymal tissue at its periphery. By moving the camera to different locations, the entire cyst lining can be visualized, and the magnified view of the interior of the cyst obtained at laparoscopy is actually superior to that obtained at open laparotomy. This inspection allows for biopsy of any suspicious areas and discovery of small biliary radicals which may communicate with the cyst. It remains to be determined whether such biliary radicals can be controlled by endostapling or suturing techniques. Indeed, it is controversial whether they need to be controlled at all when the cyst fluid is only bile-tinged [2]. The port placement described is best suited to cysts in the usual position [2] on the dome of the right lobe, but can easily be modified as the cyst position warrants. Also, if the cyst is adherent to the diaphragm, presumably as the residuum of prior percutaneous drainage procedures it should be dissected free enough to expose a suitable portion of cyst dome for excision. Where cysts are in difficult or posterior locations, it may facilitate the procedure to use an angled or flexible laparoscope.

It should be emphasized that the majority of simple hepatic cysts are asymptomatic and do not require any intervention at all. However, since laparoscopic intervention has a low morbidity and simple hepatic cysts tend to recur after percutaneous drainage, we suggest that if the durability of laparoscopic fenestration is verified, it may become the primary treatment for symptomatic simple cysts. Also, since the operation performed laparoscopically is functionally identical to the open procedure, there is no reason to predict that the long-term results would be different. Lastly, since percutaneous drainage or sclerosis may lead to infection [7] or promote adherence of the cyst to surrounding structures and thus complicate subsequent fenestration, it may be that laparoscopic fenestration should be the optimal initial treatment of symptomatic cysts after fine-needle diagnostic aspiration.

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