INTRODUCTION

There is no clear consensus on whether laparoscopic or open surgery should be performed as a surgical method in the treatment of liver hydatid cysts.\(^1\) Laparoscopic surgery's most important disadvantage is spread of the cyst content into the whole abdomen and consequent risk of anaphylaxis and, lately, recurrence.\(^2\) Different surgical methods and materials to reduce this spread have been developed by several surgeons.\(^3\) Sterilisation of the liver cyst cavities is a significant step in surgical treatment of these cysts.

We previously performed a study addressing the Foley catheter method in the sterilisation of cyst cavities with open surgery. Recently, we have been laparoscopically using Foley catheters for sterilisation of the cyst cavities. We tried laparoscopically in five cases with six cysts. A Foley catheter can be used in the sterilisation of hydatid cysts cavity both in laparoscopic and open interventions. We think that this procedure can reach cysts at all locations of liver and be applied to multiple liver cysts, too. From laparoscopic point of view, the method we presented is innovative procedure. To date, we have not seen any morbidity including recurrence and mortality in cases we applied this procedure.

METHODOLOGY

Following insufflation through a 10-mm trocar over the umbilicus, entry through other trocars is performed according to the localisation of the cyst. Generally, three or four 10-mm trocars are used [Figures 1 and 2]. An explorative laparoscopy is performed. Cyst or cysts are localised. If present around the cyst, adhesiolysis is performed. Cyst is isolated with hypertonic saline-soaked rolled gauze strips. In cases of open surgery, we clamp the Foley catheter that we fixed on a retractor. However, laparoscopically, Foley catheter is tightly clamped over the trocar until sterilisation time is over. We report the details and outcomes of this novel procedure. We tried laparoscopically in five cases with six cysts.
The cyst is punctured with a Veress needle (connected to a three-way tap). A double succer is entered through other trocars (to operate as one being within and the other out of the cyst) stand by. The cyst is punctured from a point as high as possible. If no fluid can be drained from the cyst cavity despite all efforts, then the policy is changed. The needle is removed; the cyst is punctured with a hook cautery. At this time, the suction device is activated. Through an orifice incised as to enable entrance of a Foley catheter to be used (about 10 mm), the suction device is introduced and the cyst content is tried to be evacuated.

After completion of evacuation, an 18–20-Fr Foley catheter is advanced through the trocar closest to the cyst. The balloon is inflated with 10 cc of saline. Cyst is, hence, hung with aid of the Foley catheter. The Foley catheter is clamped tightly over the trocar which it is advanced through. It is ready to inject scolicidal agent into the cysts. Through other canal of the Foley catheter, scolicidal agent is administered within the cyst by using a catheter-tipped syringe.

During the injection of scolicidal agent, the clamp is released and the Foley catheter is kept tightly in place. The cyst is filled with fluid until tension of the cyst is increased. After that, 10 min is awaited. Then, the fluid is aspirated and the balloon is emptied. The Foley catheter is removed in a clamped position.

The cavity content is aspirated with a suction device via a 10-mm trocar advanced through the previously dilated orifice. After drainage of the cavity is ensured, the entry site is further dilated. The cavity is then reviewed. Remnants from a vesicle or laminar layer are drained, if present.

Schematic illustration of the technique is shown in Figure 3.

After that, the next step will be surgical treatment of the cyst cavity. In general, wide partial cystectomy–unroofing is performed. The isolation strips around the cyst and excised adventitia are removed with aid of an endobag. If there is bile leakage in the remaining cyst cavity, this area is sutured. A drainage tube is inserted. Trocars are removed. Carbon dioxide is evacuated. The procedure is completed. Characteristics of patients (age, gender, application complaint, diagnostic method, features of the cyst, length of stay, tracking period, recurrence, morbidity, morality) are specified in Table 1.

**DISCUSSION**

Famous surgery textbooks, it is mentioned that percutaneous needle treatment of hepatic hydatid cysts is now an alternative to surgery. However, surgical treatment maintains its importance in Type 3, symptomatic Type 4 and 5 cysts, complicated cysts and cysts in which PAIR fails. There are some principles in surgical treatments of liver
cysts. These patients usually receive an initial antiparasitic treatment for 15–20 days. Principles of open surgical treatment include some phases, including an approach to the cyst with an appropriate incision; isolation, sterilisation and evacuation of the cyst and treatment of the cavity.[1]

There are various needles used for sterilisation[3] (Veress, Silverman and Chiba). Besides these, sterilisation can be performed using a locking umbrella trocar, aspirator-grinder apparatus or liposuction device, as well as some specific devices.[3]

In cases where cysts are difficult to reach, locking umbrella trocars are unavailable; or in cysts where these trocars fail, a successful sterilisation with Foley catheter method can be performed. It is very easy for an experienced surgeon to sterilise the cavity via Foley catheter, as long as the entry sites of the trocars properly function for reaching to the cyst.

To date, we have not seen any morbidity including recurrence and mortality in cases we applied this procedure.

CONCLUSION

In conclusion, sterilisation of hepatic hydatid cysts treated laparoscopically with aid of a Foley catheter is a simple, effective and cost-effective method. A Foley catheter can be used in sterilisation of hydatid cysts cavity both in laparoscopic and open interventions. We think that this procedure can reach cysts at all locations of the liver and be applied to multiple liver cysts, too. From laparoscopic point of view, the method we presented is innovative procedure.

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Conflicts of interest
There are no conflicts of interest.

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| Patient | Age | Gender | Application complaint | Diagnostic method | Number of cysts | Cyst localisation | Cyst size (cm) | Cyst type | Length of stay (days) | Tracking period (months) | Recurrence | Morbidity | Mortality | Tracking period (months) | Recurrence | Morbidity | Mortality |
|---------|-----|--------|------------------------|-------------------|-----------------|-----------------|---------------|-----------|----------------------|--------------------------|------------|-----------|-----------|--------------------------|------------|-----------|-----------|
| Patient 1 | 30 | Female | Abdominal pain, nausea | USG, CT | 2 | Right lobe | 9×8 | 3 | 17 | 13 | No | No | No |
| Patient 2 | 50 | Male | Abdominal pain, nausea | USG | 1 | Left lobe | 7×5 | 3 | 6 | 28 | No | No | No |
| Patient 3 | 50 | Female | Abdominal pain | USG | 1 | Left lobe | 7×6 | 3 | 6 | 16 | No | No | No |
| Patient 4 | 32 | Female | Abdominal pain | CT | 1 | Left lobe | 7×6 | 3 | 5 | 2 | No | No | No |
| Patient 5 | 44 | Female | Abdominal pain | USG | 1 | Left lobe | 4×4 | 2 | 2 | 2 | No | No | No |

USG: Ultrasonography, CT: Computed tomography