



Daughter cyst sign in liver hydatid cyst

Mohamed Ali Chaouch¹ · Mohamed Wejih Dougaz¹ · Sarah Cherni¹ · Ramzi Nouira¹

Received: 30 May 2019 / Accepted: 27 June 2019 / Published online: 1 July 2019
© Indian Society for Parasitology 2019

Abstract Daughter cyst sign is one of the most characteristic imaging findings of liver hydatid cysts. It is schematically divided into two types according to the daughter cyst localization in regard to the hydatid cyst wall: endogenous daughter cysts and exogenous daughter cysts. The endogenous daughter cyst is presented by a small cyst that protrudes into the lumen of the cystic mass. The exogenous daughter cysts are enclosed in the laminated layer then gradually pushed outwards giving the hydatid a bumpy appearance that distorts the classic circular radiological image. Imaging findings could detect these daughter cysts and dictate some additional precautions during surgical procedures. This surgery is associated with a high recurrence rate essentially in case of exogenous daughter cysts. However, if we detect many exogenous daughter cysts, a radical treatment should be favored otherwise the post-operative recurrence will be certain.

Keywords Daughter cyst sign · Liver hydatid cyst · Endogenous daughter cysts · Exogenous daughter cysts

The liver is the most common location of hydatid cyst (Jerraya et al. 2015). During the evolution of the liver hydatid cyst, endogenous and exogenous formations called daughter cysts may appear (Lee et al. 2000). Daughter cyst sign is one of the most characteristic imaging findings of liver hydatid cysts. It is essentially reported in CE 2 and 3 of WHO-IWGE ultrasound images classifications (Group WIW 2003). It is

schematically divided into two types according to the daughter cyst localization in regard to the hydatid cyst wall. The first represents a small cyst that protrudes into the lumen of the cystic mass and the second lies along the outer wall of the cyst (Lee et al. 2000). The exogenous daughter cysts are enclosed in the laminated layer then gradually pushed outwards (Fig. 1a), giving the hydatid a bumpy appearance that distorts the classic circular radiological image (Klotz et al. 2000). Endogenous daughter cysts are not enclosed in the laminated layer, they float in the mother cyst and have a reproductive role (Fig. 1b). Daughter cysts can be easily identified with an abdominal ultrasound. It reveals a hypoechoic to anechoic cysts in the lumen of the mother cysts or enclosed in the mother cyst wall (Fig. 1a) (Klotz et al. 2000). In CT-scan, it is seen as peripherally arranged cystic lesions appearing in the lumen of mother cyst with high-attenuation oval or round masses (Klotz et al. 2000). Concerning MRI findings, the presence of daughter cysts is seen as endogenous or exogenous proliferations more or less joined to the germinative layer, with a hypointense signal compared to that of the intracystic fluid with T1 weighting and spin-density weighting. On T2-weighted images, the signal intensity of the daughter cysts was higher and was confused with that of the hydatid matrix (Marani et al. 1990; Pendse et al. 2015). Surgery is the treatment of choice of liver hydatid cyst. It can be conservative or radical. It is associated with a recurrence rate of 10% (Jerraya et al. 2015). It can be due to various mechanisms like dissemination during the surgical procedure of an endogenous daughter cyst (Fig. 2) or to missed exogenous daughter cysts after conservative surgery (Jerraya et al. 2015). It is widely admitted that exogenous daughter cysts are more determinant than endogenous daughter cysts in recurrence rate. These exogenous daughter cysts were identified in 16% to 19% of hydatid cyst cases (Voros et al. 1999; Tagliacozzo et al.

✉ Mohamed Ali Chaouch
Docmedalichaouch@gmail.com

¹ Department B of Surgery, Charles Nicolle Hospital, Tunis, Tunisia

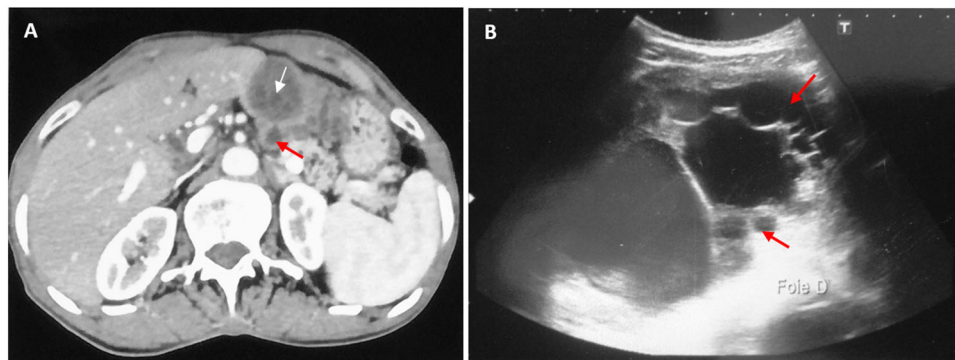


Fig. 1 Axial abdominal CT scan image (a): exogenous daughter cyst appearing as a peripherally lined round lesion with fluid in the center with higher attenuation values than the mother cyst (red arrow) representing the daughter cyst sign of an exogenous daughter cyst. Endogenous daughter cyst appearing in the lumen of mother cyst with high-attenuation oval masses (white arrow) representing the daughter

cyst of an endogenous daughter cyst. Liver ultrasound image (b) objectifying many hypoechoic round cystic lesions occupying the periphery of a liver hydatid cyst (red arrows) representing the daughter cyst sign of an exogenous daughter cyst (color figure online)



Fig. 2 Intraoperative view of an endogenous daughter cyst (white arrow) localized in the lumen of mother hydatid cyst wall (white arrow)

2011). These rates were similar to the average rates of hydatid cyst recurrence reported in the literature after conservative surgery (Tagliacozzo et al. 2011; Yorganci and Sayek 2002). Imaging findings were relevant to detect these daughter cysts and dictate some additional precautions during surgical procedures. They guide surgeons to remove them, especially, in case of conservative treatment. If we detect many exogenous daughter cysts, a radical treatment should be favored otherwise the post-operative recurrence will be certain. Moreover, surgery of a secondary recurrence of liver hydatid cyst is technically more difficult with

considerably increases of mortality and morbidity rates of this benign pathology.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

- Group WIW (2003) International classification of ultrasound images in cystic echinococcosis for application in clinical and field epidemiological settings. *Acta Trop* 85(2):253–261
- Jerraya H, Khalfallah M, Osman SB, Nouira R, Dziri C (2015) Predictive factors of recurrence after surgical treatment for liver hydatid cyst. *Surg Endosc* 29(1):86–93
- Klotz F, Nicolas X, Debonne JM, Garcia JF, Andreu JM (2000) Kystes hydatiques du foie. *Encyclopédie médico-chirurgicale*. Elsevier, Paris (**hépatologie**)
- Lee H-J, Woo S-K, Kim J-S, Suh S-J (2000) “Daughter Cyst” sign: a sonographic finding of ovarian cyst in neonates, infants, and young children. *Am J Roentgenol* 174(4):1013–1015
- Marani SA, Canossi GC, Nicoli FA, Alberti GP, Monni SG, Casolo PM (1990) Hydatid disease: MR imaging study. *Radiology* 175(3):701–706
- Pendse HA, Nawale AJ, Deshpande SS, Merchant SA (2015) Radiologic features of hydatid disease: the importance of sonography. *J Ultrasound Med* 34(5):895–905
- Tagliacozzo S, Miccini M, Bonapasta SA, Gregori M, Tocchi A (2011) Surgical treatment of hydatid disease of the liver: 25 years of experience. *Am J Surg* 201(6):797–804
- Voros D, Kalovidouris A, Gouliamos A, Vlachos L, Danias N, Papadimitriou J (1999) The real incidence of extracapsular (satellite) cysts of liver echinococcus. *HPB Surg* 11(4):249–252
- Yorganci K, Sayek I (2002) Surgical treatment of hydatid cysts of the liver in the era of percutaneous treatment. *Am J Surg* 184(1):63–69

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.