

CME Article

Clinics in diagnostic imaging (I2I)

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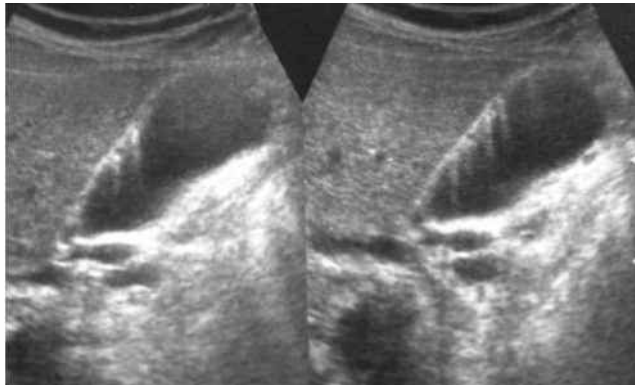


Fig. 1 US image of the gallbladder.

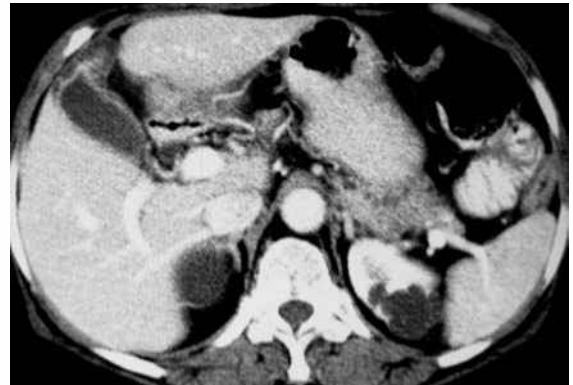


Fig. 2 Axial CT image of the gallbladder.

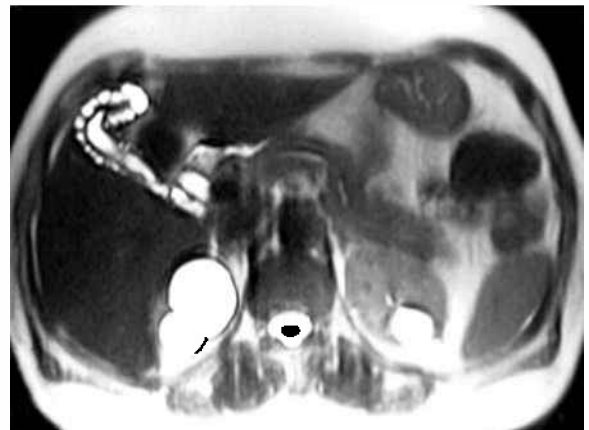
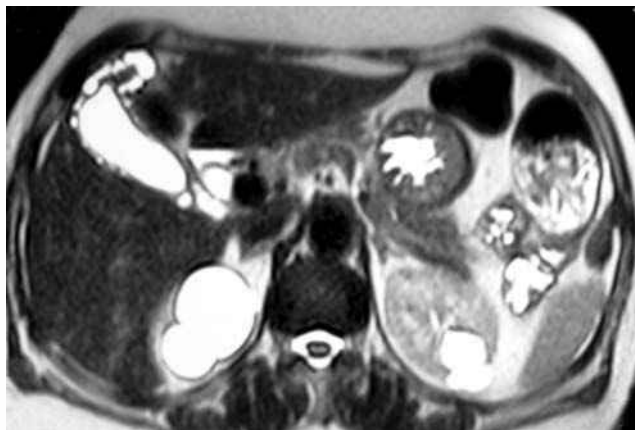


Fig. 3 (a) Pre-meal and (b) post-meal axial HASTE MR images.

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CASE PRESENTATION

A 50-year-old obese woman was evaluated for episodic pain in the right hypochondrium. Physical examination of the patient was unremarkable. Ultrasonography (US) (Fig. 1) and computed tomography (CT) (Fig. 2)

were performed during the initial evaluation. Magnetic resonance (MR) imaging (Fig. 3) was subsequently performed. What do the US, CT and MR imaging show? What is the diagnosis?

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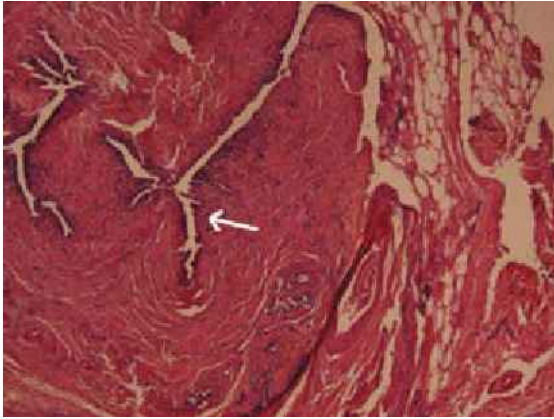


Fig. 4 Photomicrograph of the resected gallbladder specimen shows a Rokitsansky-Aschoff sinus (arrow) (Haematoxylin & eosin, $\times 40$).

IMAGE INTERPRETATION

On US, comet tail artifacts were noted, extending from the gallbladder wall, without any calculus in its lumen (Fig. 1). CT demonstrated thickened gallbladder walls, with low attenuation areas within the wall, consistent with Rokitsansky-Aschoff sinuses (Fig. 2). MR images confirmed diffuse adenomyomatosis, and showed rounded foci with high signal intensity, indicating bile within the thickened gallbladder wall, a condition described as the “pearl necklace sign” (Fig. 3a). This finding was seen more prominently in the post-meal study (Fig. 3b). Incidentally-detected bilateral simple renal cysts were also observed on imaging.

DIAGNOSIS

Gallbladder adenomyomatosis.

CLINICAL COURSE

The patient underwent laparoscopic cholecystectomy with an uneventful postoperative recovery. Histopathological examination confirmed the diagnosis of adenomyomatosis (Fig. 4).

DISCUSSION

Adenomyomatosis is an acquired, benign and degenerative condition of the gallbladder mostly seen in adults. It is characterised by mucosal proliferation with invaginations and diverticula penetrating into the thickened muscular layer (Rokitsansky-Aschoff sinuses). It has been observed in 2%–5% of the cholecystectomy specimens.⁽¹⁾ Most of the patients with adenomyomatosis remain asymptomatic, and the diagnosis is usually an incidental finding, either on US performed for the detection of stones, or by histological examination of surgical gallbladder specimens. Only occasionally does

adenomyomatosis not associated with cholelithiasis cause right upper quadrant pain. Adenomyomatosis consists of three types: focal, segmental and diffuse. Segmental adenomyomatosis has a higher risk of developing into gallbladder carcinoma, especially in the fundal region of elderly patients.⁽²⁾ Nabatame et al reported a higher incidence of epithelial metaplasia in the fundal mucosa of segmental adenomyomatosis than in the neck mucosa.⁽²⁾ This finding explains the risk of increased carcinogenesis in the fundal mucosa of segmental adenomyomatosis.

US is a sensitive modality for the diagnosis of gallbladder adenomyomatosis, but this method has a high interobserver variability because of its dependence on the operator’s skill. On US, adenomyomatosis is seen as a diffuse or segmental thickening of the gallbladder wall with reverberation artifacts (comet tails).⁽³⁾ Reverberation artifacts are produced when the sound reverberating within each fluid space (Rokitsansky-Aschoff sinuses) echo repeatedly off the gallbladder wall.

The use of CT and MR imaging for the diagnosis of gallbladder adenomyomatosis has also been described. On CT, a thickened gallbladder wall is observed, along with intramural fluid attenuation and non-enhancing areas suggestive of Rokitsansky-Aschoff sinuses within the wall.⁽⁴⁾ MR imaging not only helps in definitive diagnosis of adenomyomatosis by confirming the presence of Rokitsansky-Aschoff sinuses, but also differentiates it from gallbladder carcinoma.^(4,5) On MR imaging, diffuse adenomyomatosis displays features of the “pearl necklace sign”. The original description of the visualisation of the “pearl necklace sign” was made on MR cholangiopancreatography, and was described by Haradome et al.⁽⁶⁾ The sign is described as small, rounded, high signal intensity foci representing Rokitsansky-Aschoff sinuses within the thickened wall of gallbladder. This sign is highly specific for adenomyomatosis.

ABSTRACT

Adenomyomatosis of the gallbladder is a condition of benign hyperplasia of unknown aetiology, characterised by local or diffuse thickening of the muscular layer, with invagination of the epithelium, forming Rokitsansky-Aschoff sinuses. Magnetic resonance imaging features are specific and help in the definitive diagnosis of this condition. A 50-year-old obese woman presented with episodic pain in the right hypochondrium. Ultrasonography, computed tomography and magnetic resonance imaging showed typical features of adenomyomatosis, which

was subsequently confirmed by laporascopic cholecystectomy.

Keywords: adenomyomatosis, gallbladder, Rokitansky-Aschoff sinuses

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SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME
Multiple Choice Questions (Code SMJ 20083B)

| | True | False |
|--|--------------------------|--------------------------|
| Question 1. Adenomyomatosis: | | |
| (a) Is a benign condition. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Is mostly observed in children. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) May be seen in up to 50% of cholecystectomy specimens. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Is symptomatic in the majority of patients. | <input type="checkbox"/> | <input type="checkbox"/> |
| Question 2. Regarding the diagnosis of adenomyomatosis: | | |
| (a) Ultrasonography is a sensitive modality. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Ultrasonography has a high interobserver variability. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Comet tail artifacts are typically seen on ultrasound. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) MR imaging helps in differentiation from gallbladder carcinoma. | <input type="checkbox"/> | <input type="checkbox"/> |
| Question 3. The “pearl necklace sign”: | | |
| (a) Is observed on ultrasonography. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Represents Rokitansky-Aschoff sinuses. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Is highly specific for adenomyomatosis. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Has been described on computed tomography. | <input type="checkbox"/> | <input type="checkbox"/> |
| Question 4. Regarding adenomyomatosis: | | |
| (a) It is a congenital condition. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Three subtypes have been described. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Diffuse variety has a higher risk of malignancy. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Malignancy is commonly observed in young patients. | <input type="checkbox"/> | <input type="checkbox"/> |
| Question 5. Rokitansky-Aschoff sinuses: | | |
| (a) Represent mucosal proliferation with invagination into the thickened muscular layer. | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) Are seen as intramural fluid attenuation areas on computed tomography. | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) Are observed on MR imaging as small, rounded, low signal intensity foci in the gallbladder wall. | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) Are more prominent on MR imaging done in the fasting state. | <input type="checkbox"/> | <input type="checkbox"/> |

Doctor’s particulars:

Name in full: _____

MCR number: _____ Specialty: _____

Email address: _____

SUBMISSION INSTRUCTIONS:

(1) Log on at the SMJ website: <http://www.sma.org.sg/cme/smj> and select the appropriate set of questions. (2) Select your answers and provide your name, email address and MCR number. Click on “Submit answers” to submit.

RESULTS:

(1) Answers will be published in the SMJ May 2008 issue. (2) The MCR numbers of successful candidates will be posted online at www.sma.org.sg/cme/smj by 15 May 2008. (3) All online submissions will receive an automatic email acknowledgment. (4) Passing mark is 60%. No mark will be deducted for incorrect answers. (5) The SMJ editorial office will submit the list of successful candidates to the Singapore Medical Council.

Deadline for submission: (March 2008 SMJ 3B CME programme): 12 noon, 25 April 2008.