

Diagnostic Usefulness of CT in Meconium Pseudocyst in a Newborn: A Case Report

신생아 태변거짓낭 진단에 있어서 CT의 유용성: 증례 보고

Hee Girl Park, MD, Kyu Soon Kim, MD, So Young Choi, MD, In Kyu Yu, MD

Department of Radiology, Eulji University Hospital, Daejeon, Korea

A meconium pseudocyst is rare and may result in the death of the neonate. Meconium pseudocysts should be distinguished from the cystic-type meconium peritonitis because of their differences in the treatment strategy. Various studies have reported the radiographic and sonographic findings of a meconium peritonitis. However, computed tomography (CT) findings of meconium pseudocyst have been rarely reported yet. In this report we present the CT findings of a patient with a meconium pseudocyst. Such CT findings may help in the proper diagnosis and to distinguish the cystic-type meconium peritonitis from the meconium pseudocyst.

Index terms

Meconium Peritonitis
Meconium Pseudocyst
CT

Received September 2, 2013; Accepted December 29, 2013

Corresponding author: Kyu Soon Kim, MD
Department of Radiology, Eulji University Hospital,
95 Dunsanse-ro, Seo-gu, Daejeon 302-799, Korea.
Tel. 82-42-611-3580 Fax. 82-42-611-3590
E-mail: kskim@eulji.ac.kr

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

A meconium pseudocyst consists of a thinning intestinal wall. The pseudocyst wall has a muscle layer continuous with the intestine but because of inflammation it has no epithelium (1).

In contrast, the cystic-type meconium peritonitis results from the meconium peritonitis. Meconium peritonitis is defined as a sterile chemical or foreign-body peritonitis that is caused by the escape of meconium from the intestinal tract into the general peritoneal cavity during the fetal or perinatal period and the small bowel is nearly always involved. In the first day the meconium is surrounded by giant cells and histocytes resulting in foreign body granulomas and subsequently in calcification (2).

Meconium peritonitis creates a cystic cavity with a fibrous wall when the inflamed intestinal loops become fixed and the result is named as cystic-type meconium peritonitis. Because of their different treatment strategies the meconium pseudocyst and the cystic-type meconium peritonitis should be distinguished. An one-stage intestinal resection with a primary anastomosis is rec-

ommended for the meconium pseudocyst. However, a cystic-type meconium peritonitis is usually treated using a drainage with subsequent elective surgery (3).

In various studies have been reported the radiologic findings of meconium peritonitis with cystic lesions. However, there are limitations to distinguish a meconium pseudocyst from a cystic-type meconium peritonitis.

For this report the literature was reviewed and the characteristic CT findings of neonates with meconium pseudocysts were discussed.

CASE REPORT

On fetal ultrasonography at week 29 week of gestation was observed a hypoechoic abdominal cyst which predominantly occupied the right abdomen. In the follow-up fetal sonography a progressive abdominal distension, polyhydramnios and an increased cyst size was shown. As a result, a newborn boy, weighing 2490 g, was delivered by cesarean at 33 weeks of gestation.

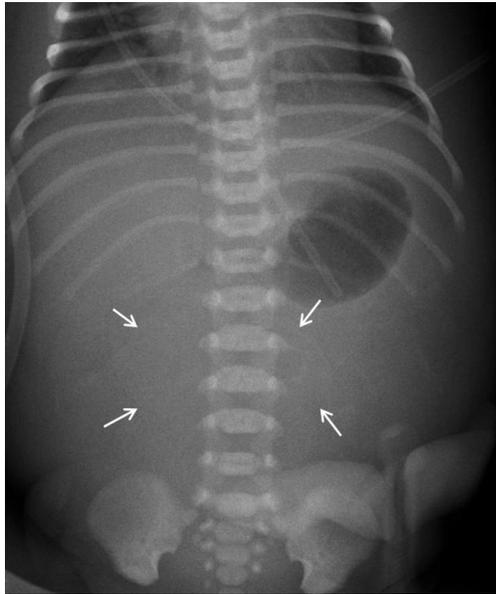


Fig. 1. Immediately after birth, the simple radiograph shows a soft tissue density mass in the mid-abdomen and egg-shell calcifications (arrows).



Fig. 2. Abdominal ultrasonography shows a well defined complicated cystic mass with echogenic walls separate from bowel.

A simple radiograph of the abdomen revealed a large egg-shell calcification in the mid abdomen (Fig. 1). An abdominal ultrasonography demonstrated a huge complicated cystic mass filled with heterogeneous echogenic material and encapsulated by dense calcification and without vascularity along the wall (Fig. 2). A CT scan showed a large hypodense cyst with calcified rim and fluid content and a measurable maximal diameter about 5 cm. On sagittal image of CT scan was found a communication between the cyst and the adjacent dilated bowel (Fig. 3B, C), suggesting a meconium pseudocyst. The scan revealed diffuse calcium deposition on the parietal peritoneum and other adjacent intra-abdominal structure also (Fig. 3A).

A resection of the cyst and the ischemic small intestine was performed followed by primary end-to-end anastomosis. The histopathological findings revealed the cyst wall contained a smooth muscle layer in continuation with the normal intestine. The final diagnosis set as meconium pseudocyst with an ongoing ileal perforation. The baby recovered well post-operative.

DISCUSSION

Shyu et al. (4) reported fetal ultrasonographic findings of meconium peritonitis, including calcification, fetal ascites, hydramnios, pseudocysts and a dilated bowel. Polyhydramnios was associated with 25–50% of cases with meconium peritonitis. In the present case, the cyst in the upper mid-abdomen was detected at 29 weeks gestation before a polyhydroamnios was developed. The prenatal sonography showed a progressive abdominal distension and polyhydroamnios at a 2 weeks follow-up.

The radiographic findings of the meconium pseudocyst in-



Fig. 3. A newborn with distended abdomen. **A.** The non-enhanced axial CT scan reveals a cystic mass with diffuse wall calcification and adjacent mesenteric calcifications. **B, C.** The contrast-enhanced axial (**B**) and sagittal CT (**C**) scans show a nonenhanced cystic mass with wall calcification and communication (arrows) between the cyst and adjacent dilated bowel.

cluded an intra-abdominal mass with rim calcification (5). The abdominal ultrasound showed a meconium pseudocyst as a well-defined hypoechoic mass surrounded by an echogenic calcified wall, indicating a contained perforation (6). On CT an intra-abdominal cyst encapsulated by wall calcification, with and without air and fluid contents are seen. The cyst is connected to the proximal intestine (1). Also diffuse calcium deposits could be seen along the parietal peritoneum and other intra-abdominal structures, including the scrotal and thoracic cavities (7).

A meconium pseudocyst consists of a thinning intestinal wall, a muscle layer continuous with the normal intestine without epithelium. Thus it is referred as a pseudocyst. The cause of a meconium pseudocyst is uncertain. However, there is an presumption about an association with dilated intestine caused by intestinal atresia and impaired intestinal blood flow because of an inflammation after intestinal perforation. If the atresia and the impaired blood flow occur before the meconium reaches the small intestine, the site will develop an intestinal atresia without meconium peritonitis. However, a pseudocyst may be formed if they occur after the meconium reaches the site. Fibroadhesive-type meconium peritonitis may be an outcome if the perforation site is sealed and another outcome may be an intestinal dilatation because of an inflammation or an impaired intestinal blood flow. As a result a meconium pseudocyst can be believed. A meconium pseudocyst may be a complication of a meconium peritonitis and therefore it likely to be misdiagnosed as a cystic-type meconium peritonitis (1).

To prevent a bacterial infection and to decompress the distended intestine a baby with a cystic-type meconium peritonitis will need an immediate operation after birth. However, to initially treat these patients with a cyst drainage and an enterostomy is possible because the cyst wall may be too frail to resect. When the patient stabilizes, a second operation is necessary to anastomose the intestine when the patient stabilizes (8). However, in patients with a meconium pseudocyst, the wall is firm enough to resect because it has a muscle layer. So an one-stage resection and a primary anastomosis can be performed (1).

Meconium pseudocysts and cystic-type meconium peritonitis present with similar clinical and radiologic findings and there may be a confusion tendency. Thus, more efforts by the neonatologist, obstetrician, pediatric surgeon and radiologist are required to distinguish the diagnosis of meconium pseudocyst

from the cystic-type meconium peritonitis.

The increased potential risk of radiation induced-cancer is an important concern in the treatment of children who are more sensitive to radiation and are more sensible to radiation and have a longer life span also (9). Therefore a CT is usually not recommended. Thus, CT findings of a meconium pseudocyst are rarely reported. But the CT findings may be helpful if there are confusions due to the sonography and simple radiograph findings. In the presented case, an additional CT showed a finely distributed calcification and the cyst connecting with the proximal intestine on a sagittal image. So, a meconium pseudocyst could be properly diagnosed and another cystic mass such as a distended bladder or mesenteric and ovarian cyst could be easily differentially diagnosed additionally.

Meconium pseudocysts should be distinguished from the cystic-type meconium peritonitis because of differences in the treatment strategy and their pathologic features (1). An early diagnosis and a proper disease management are essential for a better prognosis.

In conclusion, the CT study was useful as a complementary imaging modality in the evaluation, the proper diagnosis of a meconium pseudocyst and for the differential diagnosis to distinct from a cystic-type meconium peritonitis also.

REFERENCES

1. Minato M, Okada T, Miyagi H, Honda S, Takazawa K, Kubota KC, et al. Meconium pseudocyst with particular pathologic findings: a case report and review of the literature. *J Pediatr Surg* 2012;47:e9-e12
2. Foster MA, Nyberg DA, Mahony BS, Mack LA, Marks WM, Raabe RD. Meconium peritonitis: prenatal sonographic findings and their clinical significance. *Radiology* 1987; 165:661-665
3. Lee YC, Chen CJ. Meconium pseudocyst: a classical and successfully treated case. *J Formos Med Assoc* 2009;108: 247-252
4. Shyu MK, Shih JC, Lee CN, Hwa HL, Chow SN, Hsieh FJ. Correlation of prenatal ultrasound and postnatal outcome in meconium peritonitis. *Fetal Diagn Ther* 2003;18:255-261
5. Simmons N, Shaw NJ, Mann G, Ibrahim CP. Large calcified intra-abdominal mass in a newborn. *Arch Dis Child Fetal*

- Neonatal Ed* 2009;94:F163
6. McNamara A, Levine D. Intraabdominal fetal echogenic masses: a practical guide to diagnosis and management. *Radiographics* 2005;25:633-645
 7. Salman AB, Karaođlanođlu N, Suma S. Abdominal, scrotal, and thoracic calcifications owing to healed meconium peritonitis. *J Pediatr Surg* 1999;34:1415-1416
 8. Tanaka K, Hashizume K, Kawarasaki H, Iwanaka T, Tsuchida Y. Elective surgery for cystic meconium peritonitis: report of two cases. *J Pediatr Surg* 1993;28:960-961
 9. Brenner D, Elliston C, Hall E, Berdon W. Estimated risks of radiation-induced fatal cancer from pediatric CT. *AJR Am J Roentgenol* 2001;176:289-296

신생아 태변거짓낭 진단에 있어서 CT의 유용성: 증례 보고

박희걸 · 김규순 · 최소영 · 유인규

태변거짓낭은 신생아에서 드물지만 치명적인 질환이다. 태변거짓낭은 양성 태변성 복막염과 구분해야 하는데 그 이유는 치료 방법이 다르기 때문이다. 여러 연구에서 태변거짓낭에 대한 단순촬영과 초음파 검사소견에 대해 보고되었으나, CT 소견은 방사선장애 때문에 드물게 시행되고 보고되었다. 본 증례에서는 태변거짓낭의 CT 소견과, 양성 태변성 복막염과의 감별에 CT 검사가 도움이 되는 것을 설명하고자 한다.

대전 을지대학교병원 영상의학과