Meckel's Diverticulum Induced Meconium Peritonitis in a Twin Pregnancy

Li-Chia Huang, Yao-Ching Hung, Chien-Chung Lee, Ming Ho

Department of Obstetrics and Gynecology, China Medical University Hospital, Taichung, Taiwan.

Meconium peritonitis is a chemical peritonitis resulting from intrauterine bowel perforation. This condition is commonly due to underlying disorders including small bowel atresia, meconium ileus, meconium plug syndrome caused by cystic fibrosis, volvulus, and intussusception. Early prenatal diagnosis can be a decisive factor in prognosis of the neonates. We report a case of fetal meconium peritonitis due to Meckel's diverticulum in a female fetus of a twin pregnancy. The condition was successfully treated surgically. A 30-year-old multipara had been artificially inseminated with her husband's sperm. A triplet pregnancy was achieved and selective fetal reduction was performed at 12 weeks' gestation at the patient's request in our hospital. Ultrasound revealed fetal ascites, intra-abdominal calcification and bowel dilation in the female fetus at 30 weeks' gestation. A normal male infant and a female infant with distended abdomen were delivered by Cesarean section at 38 weeks' gestation. The female infant underwent emergency surgical intervention to treat her progressive abdominal distension. Meckel's diverticulum associated with intussusception and intestinal atresia near the terminal ileum was found. Segmental resection of the pathological intestine followed by end-to-end anastomosis were performed. Post-operative recovery was uneventful. Prenatal diagnosis of meconium peritonitis can be achieved by vigilant ultrasonographic examination. Early diagnosis and early surgical intervention are the decisive factors for good prognosis. **(Mid Taiwan J Med 2005;10:218-21)**

Key words

echogenic bowel, intussusception, Meckel's diverticulum, meconium peritonitis, twin pregnancy

INTRODUCTION

Fetal meconium peritonitis has an estimated incidence of one in 35,000 live births. The meconium escapes into the peritoneal cavity through a perforation of the gut causing an inflammatory reaction [1]. We present a twin pregnancy following artificial insemination in which one co-twin had fetal meconium peritonitis due to Meckel's diverticulum with intussusception and atresia.

CASE REPORT

A 30-year-old female, gravida 2, para 1 who had been artificially inseminated with her husband's sperm for gender selection conceived a triplet pregnancy. Selective fetal reduction was performed at 12 weeks' gestation with potassium chloride injection at the request of the parents at our hospital. Her pregnancy course was uneventful after the selective fetal reduction. At 30 weeks' gestation, she was referred to our hospital because ultrasonographic examination revealed fetal intra-abdominal calcification, ascites and bowel dilation in the female fetus (Figs. 1, 2). Fetal cardiac ultrasound revealed no abnormalities, or other abnormal structural findings. Congenital infection was not considered because no evidence of anomaly was seen in the other twin. Meconium peritonitis was preliminarily diagnosed based on the

Received : 11 July 2005. Revised : 25 August 2005.
Accepted : 16 September 2005.

Address reprint requests to : Ming Ho, Department of Obstetrics and Gynecology, China Medical University Hospital, 2 Yuh-Der Road, Taichung 404, Taiwan.

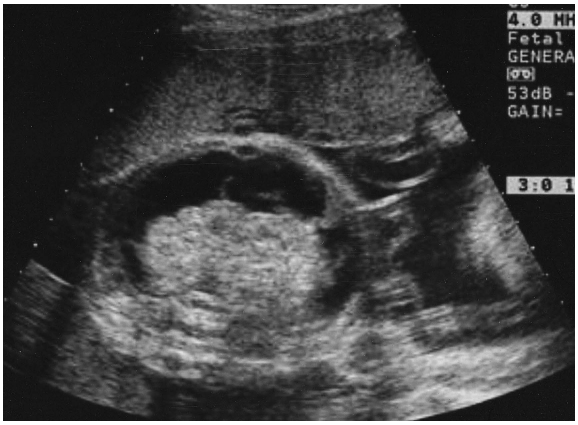

Fig. 1. Fetal ascites with intra-abdominal calcification.

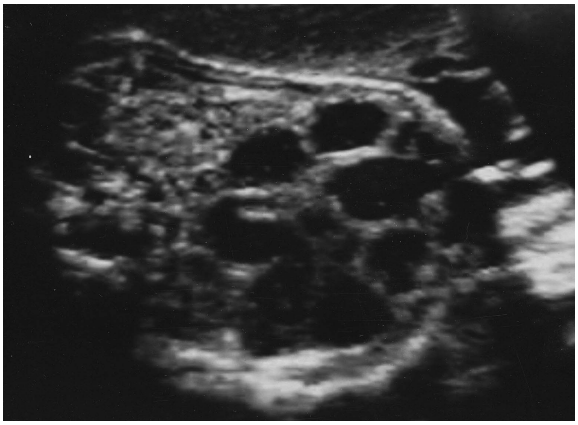
Fig. 2. Dilated bowel.

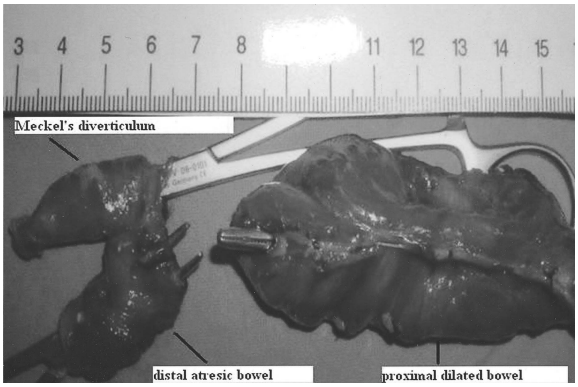

Fig. 3. Resected intestine and Meckel's diverticulum (upper segment).

ultrasonographic examination. The mother and her family were informed that follow-up or termination of the pregnancy would depend on whether or not fetal ascites and bowel dilatation worsened. Serial ultrasound was performed during each of the subsequent weekly antenatal visits. Fetal ascites resolved spontaneously at 36 weeks' gestation. The twins were delivered by Cesarean section at 38 weeks' gestation. The female neonate weighed 2350 g and the male neonate weighed 2570 g. Apgar scores were 9 and 10 at one and five minutes respectively for both neonates. Progressive distention of the abdomen of the female neonate was noted. Abdominal roentgenography did not reveal significant localized intestinal dilation on the first day of delivery. However, progressive intestinal gas formation and bilious vomiting were noted on the second post-delivery day. Lower gastrointestinal barium serial examination was performed and a preliminary diagnosis of intestinal obstruction was made.

The female neonate underwent emergency laparotomy on the third post-delivery day. Operative findings were as follows: adhesive bands over the intestinal surface, meconium deposits in the peritoneal cavity, proximal dilated small bowel, 75 cm from the Trietz ligament, and atresic distal small bowel, 25 cm from the ileocecal valve. An atresic site and invagination of the Meckel's diverticulum into the distal narrowing bowel segment were found after the occluded ends had been separated (Figs. 3). A portion of the small bowel was resected (including a 10 cm proximal section above and a 3 cm section below the affected site) and end-to-end anastomosis was done. Post-operative recovery was uneventful.

DISCUSSION

Meconium peritonitis is a sterile chemical inflammatory process caused by seepage of meconium into the peritoneal cavity via a bowel perforation. Many intrauterine perforations occur proximal to an intestinal obstruction. For example, intrinsic perforations are responsible for meconium ileus, intestinal atresia and stenosis and extrinsic perforations lead to volvulus and peritoneal bands or adhesion [2]. Since fetal meconium is sterile, in utero leakage of bowel contents does not lead to bacterial contamination. Prognosis is variable and depends on the presence of associated abnormalities and underlying etiology.

Intra-peritoneal calcifications are considered to be the most characteristic manifestation of meconium peritonitis. Intra-peritoneal meconium induces an inflammatory reaction, stimulating the formation of fibrotic tissue, which then calcifies. Abdominal calcifications are considered characteristic of meconium peritonitis; however, the identification of calcification in the fetal abdomen does not always indicate meconium peritonitis. Differential prenatal diagnosis of meconium peritonitis is necessary. The most common differential diagnosis is nonimmune hydrops. The presence of pleural and/or pericardial effusions, skin edema and placentomegaly are common in nonimmune hydrops and not typical for meconium peritonitis [3]. Other potential etiologies of calcifications that must be considered include liver, spleen calcification, cytomegalovirus infection and calcified neoplasm. Meconium peritonitis can be distinguished from these etiologies by antenatal ultrasound. Common findings are intra-peritoneal distributed calcifications, polyhydramnios, dilated bowel loops and fetal ascites. In addition, various anomalies are associated with meconium peritonitis. Small bowel disorders are found in approximately 50% of cases. Most common bowel pathologies are volvulus, atresia, meconium ileus, intussusception, internal hernias, congenital bands and perforation of Meckel diverticulum. According to Petrikovsky et al, cystic fibrosis is diagnosed in 15% to 40% of cases [3]. However, cystic fibrosis is rarely diagnosed in Asians; therefore, specific examinations for cystic fibrosis were not done for our patient. In addition, chromosome abnormalities should be excluded along with infectious and immunological etiologies. Moreover, meconium pseudocyst, inguinal hernia and hydrocele have also been reported to be associated with meconium peritonitis.

Meconium peritonitis is commonly classified into three types. Type I is known as the fibro-adhesive type, and results from massive deposition of calcium along the peritoneum which eventually seals off the bowel lesion. The pseudo-cystic type (type II) is the most common sonographic presentation of meconium peritonitis and appears as a hyperechoic mass with a well-defined rim. Ascites is also commonly seen in patients with this form. The diffused type (type III) is usually associated with polyhydramnios, fetal ascites, and numerous intra-abdominal calcifications. The fetal abdominal wall may also appear thickened due to edema [3,4]. Type II meconium peritonitis was diagnosed in our patient because of the well-defined hyperechoic mass with ascites found on ultrasound.

In conclusion, careful antenatal ultrasonographic examination can help precisely diagnose fetal meconium peritonitis. Early detection and appropriate management may improve the overall prognosis. Determination of delivery time is based on fetal condition and increasing ascites. Serial ultrasound examinations are indicated to assess the degree of ascites. Prenatally detected cases of meconium peritonitis have a good prognosis and low perinatal mortality. In a review of the literature, perinatal survival rate in patients without chromosomal or rare infectious etiologies is greater than 80%. In about 35% of cases, no surgical exploration is needed. However, in 20% of cases, intense chemical peritonitis may seal the intestinal perforation permanently. Fifty percent of newborns required laparotomy and intestinal exploration, and most required resection of atretic or perforated segments [3]. Consequently, early pediatric surgical consultation is required for some selective cases to prevent unnecessary morbidity.

REFERENCES

1. Foster MA, Nyberg DA, Mahoney BS, et al. Meconium peritonitis: prenatal sonographic findings and their clinical significance. [Review] *Radiology* 1987;165:661-5.
2. Newborn Surgery. Editor Puri, Publisher: Butterworth Heinemann. Oxford J Boix-Ochao Meconium Peritonitis 1996:328-33.
3. Petrikovsky B, Kenigsberg K, Pletcher B. Meconium peritonitis mimicking urinary ascites. http://www.thefetus.net (2005 March 10).
4. Agrawal N, Kriplani A, Bhatla N, et al. Idiopathic origin of meconium peritonitis. *Indian J Pediatr* 2000; 67:845-6.

麥克氏憩室導致胎便性腹膜炎

黃莉佳　洪耀欽　李建忠　何銘

中國醫藥大學附設醫院　婦產部

胎便性腹膜炎是一個化學性腹膜炎由於子宮內胎兒腸穿孔所導致，原因包括小腸閉鎖、腸阻塞、腸扭結和腸套疊引起的胎便塞子症候群等。產前診斷是新生兒預後的決定性因素。我們報告一對雙胞胎病例，其中一個胎兒因爲麥克氏憩室致胎便性腹膜炎。同時以外科手術方法成功治療。一位30歲經產婦以人工受孕方式懷了三胞胎。在妊娠12週時，孕婦要求進行減胎手術。在懷孕30週時，超音波檢查發現女胎兒有腹水，腹腔內鈣化及腸子擴張的情形。在妊娠38週進行剖腹生產產下一男一女。出生時，女嬰的腹部呈現膨脹，出生後第3天，因疑似腸阻塞，進行手術。手術發現結腸末端有麥克氏憩室合併腸套疊。在發生病變的腸子作切除及端端吻合術，術後情況穩定。胎兒期胎便性腹膜炎可以由超音波作診斷，早期診斷及早治療，對新生兒的預後十分重要。（**中台灣醫誌 2005;10:218-21**）

關鍵詞

高回音腸子，腸套疊，麥克氏憩室，胎便性腹膜炎，雙胞胎

聯絡作者：何銘

地　　址：404台中市北區育德路2號

中國醫藥大學附設醫院　婦產部

收文日期：2005年7月11日　　修改日期：2005年8月25日

接受日期：2005年9月16日