Taiwanese Journal of Obstetrics & Gynecology 56 (2017) 709–710

Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Correspondence

Perspective of Taiwan's experience in the management of meconium peritonitis

Meconium peritonitis, a rare condition with an incidence of 1 in 30,000 births, is an aseptic chemical peritonitis resulting from intrauterine bowel perforation, associated with significant neonatal risk with morbidity and mortality [1]. Based on our search of PubMed (1970–May 2017; search terms: "meconium peritonitis," "Taiwan"; https://www.ncbi.nlm.nih.gov/pubmed/?term=meconium+peritonitis%2C+Taiwan), there are a few cases of fetal meconium peritonitis available in Taiwan [2–16]. To share the Taiwan's experience in the management of meconium peritonitis, we would like to report one new case and update this topic.

A 32-year-old, gravida 1, woman with 32 gestational weeks was referred to the Taipei Veterans General Hospital for further management, because of accidental findings of fetal dilated bowel loops and maternal polyhydramnios. Prenatal ultrasound confirmed fetal dilated bowel loops, abdominal pseudocyst and maternal polyhydramnios (amniotic fluid index of 29 cm). Two weeks later, repeat ultrasound showed the similar findings. After thorough and detailed discussion, the male neonate weighting 2560 g was delivered at 35 weeks of gestation by cesarean section. Apgar scores were 7 at 1 min and 9 at 5 min. The newborn was transferred to the neonatal intensive care unit for further treatment. Physical examination showed abdominal distension. Therapeutic trial of gastrograffin by nasogastrotube feeding was done and the following abdominal radiograph revealed dilated loops of small and large bowel. He was started on metronidazole and underwent laparotomy 24 h after birth. Meconium peritonitis with cyst calcification in the central abdomen was noted. There were jejunum atresia, bowel necrosis, and bowel perforation. Resection of jejunum and an end-to-end anastomosis were performed. Postoperative recovery was unremarkable. The newborn has a normal development 5 months after birth.

In Taiwan, the first English article addressing the diagnosis and management of meconium peritonitis was reported by Yeh and Chen in 1982 [2]. Wu CC first reported the typical sonographic findings of generalized meconium peritonitis in 1988 [3]. Professor Hsieh shared the experience of prenatal diagnosis and postnatal management of surgically correctable fetal malformations, including meconium peritonitis [4]. Hsu and colleagues have summarized 20 cases of meconium peritonitis addressing the outcomes of these newborns after surgical intervention [5]. The authors concluded that early aggressive operation and meticulous postoperative care had a better survival after 1986 (no mortality [0/6] after 1986 vs. mortality rate of 42.9% [6/14] between 1980 and 1986) [5]. Lin and colleagues reported a prenatal ultrasound diagnosis of meconium peritonitis in the second trimester, and found fetal meconium peritonitis could be made by the findings of fetal ascites, intra-abdominal calcification and maternal polyhydramnios [6].

In 1992, Chang and colleagues reported 16 neonates with meconium ileus and found not all of meconium ileus should be managed by surgery [7]. Newborns with meconium peritonitis can be managed by gastrograffin enema initially, and some of them showed a good response without further need of surgery (called uncomplicated ileus) [7]. We also performed nasogastric tube feeding by gastrograffin for this newborn; however, this newborn had jejunum atresia and intestinal perforation, resulting to the need of surgical correction.

Soong and colleagues reported 3 cases of meconium peritonitis, and one was successfully treated conservatively [8]. Wang and colleagues [9,10] emphasized the importance of infection prevention for these newborns with meconium peritonitis, since they are at higher risk of infection and following sepsis, and subsequently die of sepsis.

In Taiwan, no intrauterine therapy has been reported before 1994. Shyu and colleagues first reported the value of intrauterine therapy for fetal meconium peritonitis [11]. The authors used ultrasound-guided aspiration and repeat paracentesis with success [11]. Nine years later, Shyu and colleagues shared the experience of 17 cases managed by intrauterine therapy and found persistent ascites, pseudocyst or dilated bowel loop were correlated with the need of postnatal surgery (sensitivity rate of 92%) [12]. In addition, persistent ascites and postnatal persistent pulmonary hypertension were associated with neonatal mortality [12].

Tseng and colleagues first reported the value of colored Doppler ultrasound in the diagnosis of meconium peritonitis at 34 gestational weeks in 1997 [13]. In 2003, Tseng and colleagues classified meconium peritonitis ($n = 19$) into 3 groups: type I, large meconium ascites; type II, a large pseudocyst; and type III, intra-abdominal calcification, small meconium ascites and/or a shrinkage pseudocyst; and found type I newborns were at the highest risk of the need of cardiopulmonary resuscitation at birth (40%, 2/5) [14]. Although the authors did not recommended what should we do for these type I fetuses, according to the Shyu's experience [13], an intrauterine therapy could be taken into consideration to minimize the cardiopulmonary resuscitation at birth.

In summary, meconium peritonitis can be diagnosed by prenatal ultrasound and treated in utero, especially for a high-risk population, such as massive ascites and hydrothorax. The overall neonatal outcome is favorable. It is reported that early detection is not associated with poor neonatal outcomes [15]; therefore, we should avoid selective termination, except those accompanied with severe malformation and uncorrected genetic mutations which could be diagnosed by advanced technology, such as conventional cytogenetic or modern genetic study (noninvasive prenatal testing – NIPT, and high-resolution imaging systems) [16–19]. The need of

http://dx.doi.org/10.1016/j.tjog.2017.08.024

surgery is only limited for those newborns with surgical indications, including bowel perforation, bowel atresia, and bowel obstruction. Conservative treatment, such as gastrografin either by mouth (nasogastric tube) or by enema could be tried first, since this strategy is not only for the assistance of diagnosis but also for the therapy [20]. Finally, infection and its subsequent sepsis are a major cause of neonatal death, suggesting that appropriate and prompt administration of antibiotics, such as metronidazole, as shown in our case, should be taken into consideration if clinical situation is indicated.

Conflicts of interest

The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

Acknowledgments

This article was supported by grants from the Ministry of Science and Technology, Executive Yuan (MOST 103-2314-B-010 -043 -MY3), and Taipei Veterans General Hospital (V105C-096; V106C-129; V106D23-001-MY2-1; and V106A-012). We further appreciate the Clinical Research Core Laboratory and the Medical Science & Technology Building of Taipei Veterans General Hospital for providing experimental space and facilities.

References

[1] Lai CW, Shek NW. Fetal meconium peritonitis and maternal liver disease. Obstet Gynecol 2016;127:740–3.
[2] Yeh ML, Chen CC. Diagnosis and management of cystic meconium peritonitis. Taiwan Yi Xue Hui Za Zhi 1982;81:485–9.
[3] Wu CC. Sonographic findings of generalized meconium peritonitis presenting as neonatal ascites. J Clin Ultrasound 1988;16:48–51.
[4] Hsieh FJ, Lin CR, Chen WJ, Chen CC, Tsai TC. Prenatal diagnosis and postnatal management of surgically correctable fetal malformations. Taiwan Yi Xue Hui Za Zhi 1989;88:226–31.
[5] Hsu CH, Jen LW, Huang FY, Chen MR, Kao HA, Ho WY, et al. Clinical observation of meconium peritonitis. Zhonghua Min Guo Xiao Er Ke Yi Xue Hui Za Zhi 1990;31:214–20.
[6] Lin MH, Jeng CJ, Wang KG, Yang YC. Prenatal diagnosis of meconium peritonitis–a case report with literature review. Zhonghua Yi Xue Za Zhi (Taipei) 1992;49:48–52.
[7] Chang PY, Huang FY, Yeh ML, Sheu JC, Chen BF, Chen CC. Meconium ileus-like condition in Chinese neonates. J Pediatr Surg 1992;27:1217–9.
[8] Soong JH, Hsieh CC, Chiu TH, Kuo DM, Chen FP, Lo LM, et al. Meconium peritonitis-antenatal diagnosis by ultrasound. Changgeng Yi Xue Za Zhi 1992;15:155–60.
[9] Wang YJ, Chen HC, Chi CS. Meconium peritonitis in neonates. Zhonghua Yi Xue Za Zhi (Taipei) 1994;53:49–53.
[10] Wang YJ, Shian WJ, Chang WT, Chen HC, Chi CS. Clinical observation of neonatal gastrointestinal perforation. Zhonghua Yi Xue Za Zhi (Taipei) 1994;53:215–9.
[11] Shyu MK, Chen CD, Hsieh FJ, Yau KI, Lin GJ, Lee ML. Intrauterine intervention in a case of recurrent meconium peritonitis. Prenat Diagn 1994;14:993–5.
[12] 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;18:255–61.
[13] Tseng CW, Chao AS, Chang FH, Chang SY, Soong YK. Color Doppler energy in prenatal diagnosis of meconium peritonitis: a case report. Changgeng Yi Xue Za Zhi 1997;20:58–61.
[14] Tseng JJ, Chou MM, Ho ES. Meconium peritonitis in utero: prenatal sonographic findings and clinical implications. J Chin Med Assoc 2003;66:355–9.
[15] Wang CN, Chang SD, Chao AS, Wang TH, Tseng LH, Chang YL. Meconium peritonitis in utero – the value of prenatal diagnosis in determining neonatal outcome. Taiwan J Obstet Gynecol 2008;47:391–6.
[16] Chen CP, Hung FY, Chern SR, Wu PS, Chen YN, Chen SW, et al. Prenatal diagnosis of mosaicism for trisomy 15 in a single colony at amniocentesis with a favorable fetal outcome. Taiwan J Obstet Gynecol 2017;56:268–9.
[17] Chen CP, Wang KG, Huang HK, Peng CR, Chern SR, Wu PS, et al. Detection of mosaic 15q11.1-q11.2 deletion encompassing NBEAP1 and POTEB in a fetus with diffuse lymphangiomatosis. Taiwan J Obstet Gynecol 2017;56:230–3.
[18] Wang PH, Chen CY, Yang MJ, Chao HT. Detection of chromosome abnormalities: beyond conventional karyotyping. J Chin Med Assoc 2015;78:379–81.
[19] Li WH, Wang PH, Chuang CM, Chang YW, Yang MJ, Chen CY, et al. Noninvasive prenatal testing for fetal trisomy in a mixed risk factors pregnancy population. Taiwan J Obstet Gynecol 2015;54:122–5.
[20] Tsai MH, Chu SM, Lien R, Huan HR, Luo CC. Clinical manifestations in infants with symptomatic meconium peritonitis. Pediatr Neonatol 2009;50:59–64.

Yu-San Lin
Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, Taipei, Taiwan

Department of Obstetrics and Gynecology, National Yang-Ming University, Taipei, Taiwan

Chang-Ching Yeh
Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, Taipei, Taiwan

Department of Obstetrics and Gynecology, National Yang-Ming University, Taipei, Taiwan

Institute of Clinical Medicine, National Yang-Ming University, Taipei, Taiwan

Wen-Hsun Chang
Department of Nursing, Taipei Veterans General Hospital, Taipei, Taiwan

Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, Taipei, Taiwan

Department of Nursing, National Yang-Ming University, Taipei, Taiwan

I-San Chan, Chi-Yao Lin
Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, Taipei, Taiwan

Department of Obstetrics and Gynecology, National Yang-Ming University, Taipei, Taiwan

Peng-Hui Wang*
Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, Taipei, Taiwan

Department of Obstetrics and Gynecology, National Yang-Ming University, Taipei, Taiwan

Institute of Clinical Medicine, National Yang-Ming University, Taipei, Taiwan

Department of Medical Research, China Medical University Hospital, Taichung, Taiwan

* Corresponding author. Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, 201, Section 2, Shih-Pai Road, Taipei 112, Taiwan. Fax: +886 2 55702788.
E-mail addresses: phwang@vghtpe.gov.tw, pongpongwang@gmail.com, phwang@ym.edu.tw (P.-H. Wang).