Venous malformations of the anterior abdominal wall in blue rubber bleb naevus syndrome: implications for antenatal and intrapartum management

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Summary: Blue rubber bleb naevus syndrome (BRBNS) is a rare vascular disorder characterized by rubbery blue–purple cutaneous nodules that are histologically thin-walled dilated vascular spaces. The exact inheritance of the disease is unknown but in cases of familial recurrence, there appears to be a pattern of autosomal dominant inheritance. The vascular lesions may manifest in any organ system but tend to predominate in the gastrointestinal tract (GI). There are only a handful of cases reported in the literature, but reported complications arising from the naevi include spontaneous GI bleeding requiring laparotomy and blood transfusion and the development of large naevi in the cervix thus preventing vaginal delivery. In this case we describe a patient with known BRBNS who developed symptomatic anaemia during her pregnancy which required antenatal admission and blood transfusion. She was managed expectantly in a multidisciplinary setting by obstetricians, gastroenterologists and an obstetric physician with the aim of a vaginal delivery. Nevertheless, she had an elective caesarean section at term for breech presentation. Surgery was complicated by the unexpected finding of venous malformations within the abdominal wall musculature and subcutaneous fat that resulted in a primary haemorrhage and required urgent blood transfusion. The patient made a good postoperative recovery and had a healthy male infant who at birth displayed no external features of BRBNS. This report demonstrates for the first time the appearance of naevi in the abdominal wall and the important considerations that need to be made regarding mode of delivery and future pregnancies.

Keywords: maternal–fetal medicine, high-risk pregnancy, clinical genetics

CASE REPORT

Blue rubber bleb naevus syndrome (BRBNS) is a rare genetic disorder of which familial recurrences consistent with autosomal dominant inheritance have been reported. The condition is characterized by multifocal, rubbery, blue–purple cutaneous nodules whose histology appears as thin-walled dilated vascular spaces. These slow-flow vascular malformations can occur in other organs, particularly the small bowel where they predispose to gastrointestinal (GI) bleeding. Lesions can also occur in other organs and tissues, including brain and muscle, and patients are at risk of thrombocytopenia and consumptive coagulopathy.^{1,2} We report the management of a patient with known BRBNS in whom vascular lesions in the anterior abdominal wall resulted in unexpected blood loss during delivery by caesarean section.

Our patient was diagnosed with BRBNS in childhood when she presented with increasing numbers of small, blue cutaneous naevi at the age of four months (Figure 1). Prior to adulthood she underwent abdominal surgery for GI bleeding from small-bowel vascular malformations on two occasions and had further surgery for bowel obstruction secondary to

abdominal adhesions. At the age of 18 years, she had a magnetic resonance imaging (MRI) brain scan that was normal. Thereafter, she remained well until age 22 years when she presented with anaemia secondary to GI bleeding that was treated successfully with sclerotherapy at endoscopy. Further surgery for bleeding from a small-bowel lesion was required at the age of 27. This was successful and the patient was discharged from further gastroenterology follow-up with iron supplements for mild anaemia (200 mg ferrous sulphate daily).

She was referred for genetic counselling prior to conceiving her first pregnancy. At the first appointment the possibility of autosomal dominant inheritance was discussed with the patient and her husband, and plans made for the surveillance of the patient, the fetus and follow-up of the baby. Routine investigations at her first antenatal appointment at eight weeks gestation showed that she was anaemic (haemoglobin 6.7 g/dL). At this time she complained of increasing fatigue on exercise but had experienced no noticeable change in her bowel habit. She was admitted to her local hospital for red blood cell (RBC) transfusion (4 units) after which her haemoglobin levels returned to the normal range.

Following multidisciplinary review by the obstetric physician and gastroenterology team, provision was made for urgent admission in the event of further acute anaemia or GI bleeding during the pregnancy. In view of the potential risk of the central

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Figure 1 Multiple, small, blue cutaneous vascular malformations on the feet of our patient characteristic of blue rubber bleb naevus syndrome

nervous system and meningeal involvement, MRI of the patient's spine was performed. No abnormalities were identified and the patient remained in good health for the remainder of her pregnancy. Investigation of the GI tract by conventional endoscopy and video capsule was deferred until the postnatal period.

BRBNS can present in the fetus with large, cystic venous malformations affecting both deep and superficial fetal tissues.³ Detailed 2-D and 3-D fetal sonography was therefore planned from 18 weeks gestation. Initial scans at 18 and 24 weeks gestation were significantly limited by severe abdominal wall scarring secondary to her previous surgery and although basic fetal biometry and anatomy could be visualized it was not possible to perform 3-D imaging to assess the thorax and back in detail. By 28 weeks gestation, when the uterus had distended to well above the umbilicus and thus abdominal wall scarring, more optimal views were obtained; no abnormalities were identified and plans for a normal delivery were made.

The patient underwent elective lower segment caesarean section for breech presentation at 42 weeks gestation, having had an unsuccessful attempt at external cephalic version. The baby was male and born in good condition (birth weight 3800 g). The patient's surgery was complicated in view of her abdominal adhesions and by bleeding from venous malformations within the abdominal wall musculature and subcutaneous fat. She required four units of RBCs at delivery and additional two units the following day. She made a good post-operative recovery and was discharged from hospital with plans for review for herself and her baby.

DISCUSSION

The patient reported herein presented with classical symptoms and signs of BRBNS during childhood and required further surgery to treat small-bowel venous malformations during adulthood. Although her pregnancy was planned, and she had been discharged from follow-up after successful treatment of her small-bowel lesions the year prior to this pregnancy,

anaemia recurred in early pregnancy, presumably due to bleeding within the GI tract. Furthermore, delivery of the baby by caesarean section was complicated by bleeding from deep, dermal and muscular venous blebs in her abdominal wall.

To date, only a handful of case reports detail the management and outcomes of women with BRBNS in pregnancy. Two patients experienced mild anaemia; the cause was unidentified in one patient who had a mild consumption coagulopathy and was secondary to bleeding from a rectal vascular malformation in the other.^{4,5} Both were treated conservatively. Conversely, a further patient developed massive GI bleeding and severe anaemia during pregnancy and required laparotomy and small-bowel resection at 19 weeks gestation to remove a segment of ileum containing multiple venous malformations.⁶ Despite these complications, these cases had good maternal and fetal outcomes. Interestingly, two other patients developed vascular malformations during their pregnancies. One developed naevi in the area of the uterine cervix that subsequently reduced in size following delivery⁷ and the other developed vulval and vaginal venous malformations that were thought to preclude vaginal delivery and resulted in delivery by elective caesarean section.⁸ The abdominal wall lesions in our patient were not clinically apparent until caesarean section, but may have enlarged during the course of the pregnancy. Thus, pregnancy may predispose to GI bleeding and the development of additional vascular malformations at anatomical sites that previously appear to be unaffected.

In summary, we conclude that because BRBNS is a multisystem disorder that poses significant risks for both maternal and fetal health during pregnancy, women with BRBNS should be managed in a multidisciplinary setting. Affected women who have had previous abdominal surgery should be counselled that fetal imaging to screen for large fetal vascular malformations may not be possible until the third trimester. Moreover, they should be tested regularly for anaemia and screened for vascular naevi in the lumbar spine, cervix and anterior abdominal wall in the third trimester in order to minimize potential risks to the patient and fetus during delivery.

REFERENCES

- 1 Domp Martin A, Vikkula M, Boon LM. Venous malformation: update on aetiopathogenesis, diagnosis and management. *Phlebology* 2010;**25**:224–35
- 2 Hofhuis WJD, Orange AP, Bonquet J. Blue rubber bleb naevus syndrome. Report of a case with consumption coagulopathy complicated by manifest thrombosis. *Eur J Pediatr* 1990;**149**:526–8
- 3 Mongrial E, Gallot D, James I, Hameury F, Vanlieferinghem P, Guilbaud L. Venous malformation of the soft tissue associated with blue rubber bleb nevus syndrome: prenatal imaging and impact on postnatal management. *Ultrasound Obstet Gynaecol* 2009;**6**:730–2
- 4 Nirmal DM, Rhodes S, Hassanaieen M. Pregnancy in blue rubber bleb syndrome: a case report. *AJOG* 2008;**199**:e14–5
- 5 Wada O, Unno N, Matsuoka R, Taketani Y. A case report: pregnancy complicated by blue rubber-bleb nevus syndrome. *J Obstet Gynaecol Res* 1999;**25**:241–63
- 6 Kanai M, Noike M, Masaki C, et al. Severe gastrointestinal bleeding during pregnancy in a case of blue rubber bleb nevus syndrome. *Semin Thromb Hemost* 2005;**31**:284–9
- 7 Tanaka N, Tsua M, Samura O, Miyoshi H, Hara T, Kudo Y. Blue rubber bleb nevus syndrome: Report of a patient with hemangiomas of the vaginal portion of the cervix appearing in pregnancy. *J Obstet Gynaecol Res* 2007;**33**: 546–8
- 8 Adeniji A, Fairlie F, Jones T, Wilkinson P. Pregnancy and the blue rubber bleb naevus syndrome. *Br J Obstet Gynaecol* 1999;**106**:1316–8