Radiology Case Reports

Volume 8, Issue 4, 2013

Spontaneous resolution of Blake's pouch cyst

Subhashree Ramaswamy, MBBS; Rajeswaran Rangasami, MBBS, MD, PhD; Seshadri Suresh, FRCOG (hon); and Indrani Suresh, MD, DCH

Blake's pouch cyst is a rare posterior fossa cystic lesion characterized by posterior ballooning of the superior medullary velum into the cisterna magna. It must be differentiated from severe malformations like inferior vermian hypoplasia and Dandy Walker malformation. We describe a case in which a diagnosis of Blake's pouch cyst was made on prenatal ultrasound and later confirmed by MRI. The cyst showed complete regression on postnatal MRI.

Introduction

Blake's pouch cyst (BPC) arises due to failure of perforation of the foramen of Magendie (1). This leads to ballooning of the superior medullary velum into the cisterna magna. The vermis is usually normal, but elevated by the cyst (1). Persistent BPC has been described as an independent entity within the Dandy Walker complex by Tortori Donati et al (2).

Case report

Routine prenatal sonography of a 25-year-old pregnant female at 25 weeks' gestation revealed a retrocerebellar cystic area that communicated with a prominent fourth ventricle (Figs. 1A, B). The cerebellar hemispheres and vermian dimensions were within normal limits for that period of gestation. There was no elevation of tentorium. Based on these sonographic findings, a diagnosis of BPC was suspected. Fetal MRI performed two days later showed a prominent fourth ventricle, elevation of superior medullary velum, an appropriate-sized vermis, and bilateral cerebellar hemispheres (Figs. 2A-D).

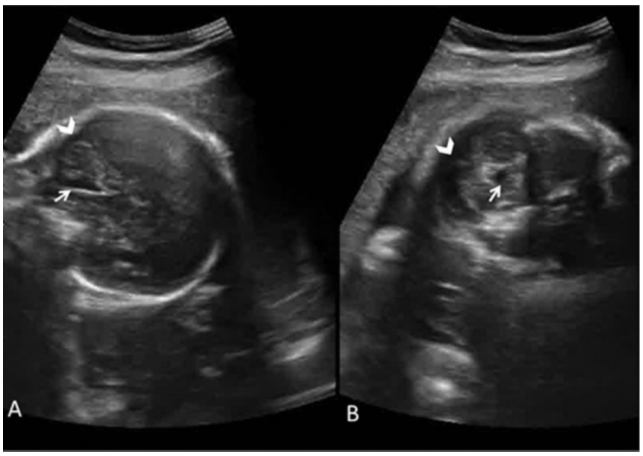

Figure 1. Sagittal (A) and axial (B) sonographic images show prominent fourth ventricle (arrow) and retrocerebellar CSF space (arrowhead).

At delivery, the baby weighed 2.18 kg and had an APGAR score of 8/10 and 9/10 at 2 and 5 minutes, respectively. Other vital signs were stable. Postnatal MRI of the neonate showed regression of the retrocerebellar CSF collection (Figs. 3A-C). The bilateral cerebellar hemispheres and vermis were unremarkable. The cisterna magna and ventricular system were within normal limits. The neonate's stay in the hospital was uneventful, and it was discharged with followup advised.

Discussion

Blake's pouch is a normal embryological structure (the rudimental fourth ventricle tela choroidea) that perforates during the 9th or 10th week (1). Perforation normally oc-

Citation: Ramaswamy S, Rangasami, R, Suresh S, Suresh I. Spontaneous resolution of Blake's pouch cyst. *Radiology Case Reports*. (Online) 2013;8:77.

Dr. Ramaswamy is a resident, and Dr. Rangasami a professor, in the Department of Radio Diagnostics, Sri Ramachandra Medical College, Chennai India. Drs. S. Suresh and I. Suresh are associated with Mediscan System Pvt Ltd, Chennai India. Contact Dr. Ramaswamy at drsubhashree2010@gmail.com.

Competing Interests: The authors have declared that no competing interests exist.

DOI: 10.2484/rcr.v8i4.877

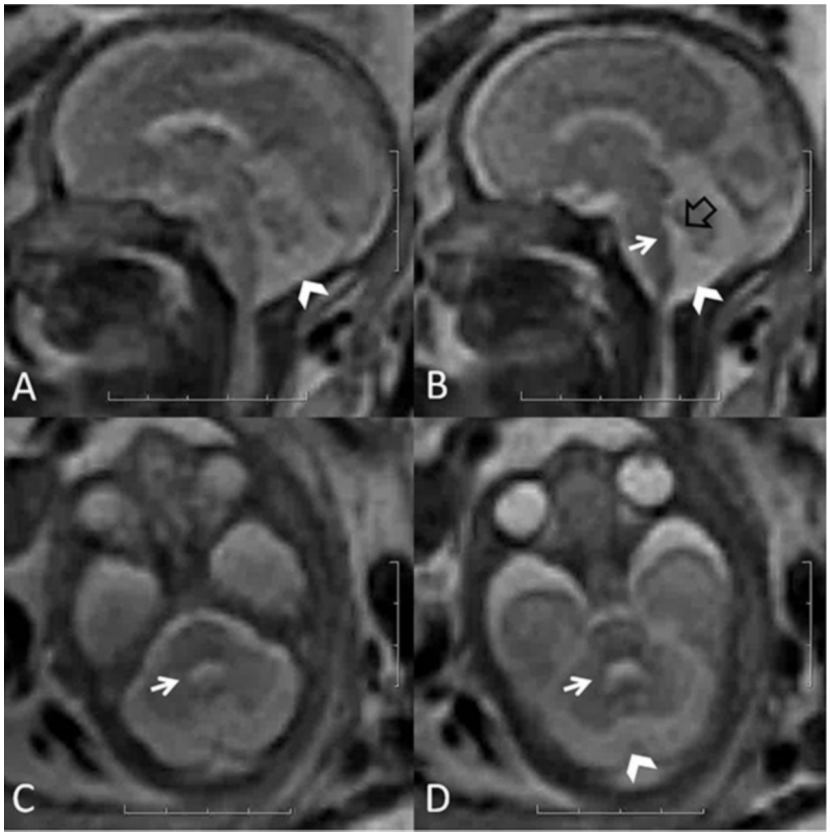

Figure 2. Prenatal axial (A, B) and sagittal (C, D) MRI images show prominent fourth ventricle (arrow), elevation of superior medullary velum (open arrow), and prominent retrocerebellar CSF space (arrowhead).

curs in the foramen of Magendie. Nonperforation of the foramen leads to persistent Blake's pouch, resulting in posterior ballooning of the superior medullary velum into the cisterna magna. During embryological development, the smaller foramen of Luschka opens later than the larger foramen of Magendie (1). Due to this nonperforation in BPC, the fourth ventricle enlarges along with the supratentorial ventricles until the foramen of Luschka opens and establishes an equilibrium of CSF outflow from ventricles into the cisterns. Sometimes the BPC disappears by the third trimester, due to late fenestration occurring at 24-26 weeks (3). In a study by D. Paladini et al (3), in 11 cases of BPC diagnosed prenatally, spontaneous resolution occurred prenatally in six cases (55%), and five cases remained the same until birth (45%).

The differential diagnosis of BPC includes Dandy Walker complex, posterior fossa arachnoid cyst, and giant cisterna magna (4). All these malformations may include varying degrees of malformation of the medullary velum, cerebellar vermis, cerebellar hemispheres, posterior fossa subarachnoid cisterns, and enveloping meningeal structures.

- Posterior fossa arachnoid cyst is seen as a CSF collection within a duplicated arachnoid layers, located in spaces between cerebellum

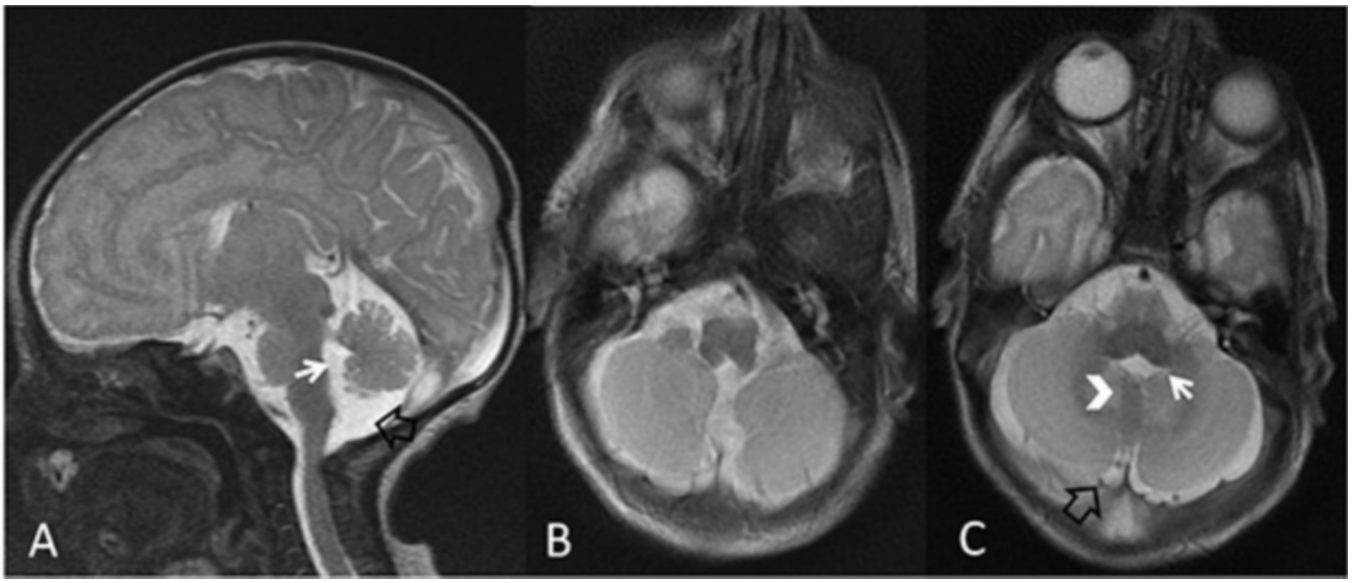

Figure 3. Postnatal sagittal (A) and axial (B, C) MRI images show unremarkable fourth ventricle (arrow), vermis (arrowhead), and retrocerebellar CSF space (open arrow).

and occipital or petrous bone (4). The torcular herophili is rarely elevated unless the cyst happens to be a large one. The falx cerebelli is usually present. The inferior vermis may be compressed.

- The term megacisterna magna was first coined by Gonsette et al in 1968 (5); here the retrocerebellar CSF subarachnoid space freely communicates with the fourth ventricle, and the vermis and cerebellar hemisphere are normally developed (4). The normal cisterna magna has an anteroposterior diameter of 3-8 mm. If the measurement exceeds 10 mm, the diagnosis of megacisterna magna can be made. The measurement is taken in the midsagittal plane from the posterior lip of the foramen magnum to the caudal margin of the inferior vermis.

- BPC and Dandy Walker malformations can cause a mass effect on cerebellum and hydrocephalus, compared with the other conditions. An associated vermian hypoplasia, a high position of the torcular herophili, and an absence of falx cerebelli help to differentiate a Dandy Walker malformation from BPC. The bending of choroid plexus below the vermis and its continuation into a pouch in BPC differentiates it from posterior fossa arachnoid cyst and Dandy Walker malformation, as it is in a normal position in posterior fossa arachnoid cyst and absent in Dandy Walker malformation.

The imaging features in BPC include a cyst present in the infra/retrocerebellar region, communicating with fourth ventricle. The cyst may not communicate with cisterna magna. A tetra ventricular hydrocephalus may or may not be present. A well-developed vermis with some degree of compression on the medial cerebellar hemispheres is present without elevation of tentorium. A retrospective study of 105 fetuses by Gandolfi et al concluded that prenatal sonography and MRI can diagnose 90% of posterior fossa lesions (6). They also stated that 90% of BPC cases have a favorable outcome when they are not associated with any other anomaly (6). Endoscopic third ventriculostomy is the favored treatment option for hydrocephalus arising due to persistent BPC (1).

In conclusion, sonography and MRI play an important role in the diagnosis of BPC. Differentiating it from other posterior fossa cysts is important because it carries a good prognosis. Elevation of superior medullary velum and the presence of an appropriate-sized vermis are clues in the diagnosis of BPC.

References

1. Erwin M. J. Cornips Geke M. Overvliet Jacobiene W. Weber et al. The clinical spectrum of Blake's pouch cyst: Report of six illustrative cases. *Child Nerv Syst.* 2010 Aug; 26(8):1057-1064. [PubMed]
2. P. Tortori-Donati, M. P. Fondelli, A. Rossi et al. Cystic. malformation of the posterior cranial fossa originating from a defect of the posterior membranous area . Mega cisterna magna and persisting Blake's pouch: two separate entities. *Childs Nerv Syst.* 1996 Jun; 12(6); 303-8. [PubMed]
3. D. Paladini , M. Quarantelli , et al. Abnormal or delayed development of the posterior membranous area of the brain: anatomy, ultrasound diagnosis, natural history and outcome of Blake's pouch cyst in the fetus . *Ultrasound in Obstetrics & Gynecology*. 2012 March ; 39(3): 279-287. [PubMed]
4. Monica Epelman M.D, Alan Daneman M.D, Susan I. Blaser M.D et al. Differential diagnosis of intracranial cystic lesions at head US: Correlation with CT and MR imaging. *RadioGraphics*. Jan 2006; 26:173 – 196. [PubMed]
5. Gonsette R, Potvliege R, Andre-Balisaux G et al. Mega-cisterna magna : Clinical, radiologic and anatomopathologic study. *Acta Neurol Psychiatr Belg.* 1968 Aug; 68(8):559-70. [PubMed]
6. Gandolfi Colleoni G, Contro E, Carletti A. Prenatal diagnosis and outcome of fetal posterior fossa collection. *Ultrasound Obstet Gynecol.* 2012 Jun; 39(6):625-31. [PubMed]