ANTENATAL MR IMAGING OF CERVICAL TERATOMAS

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ABSTRACT

The majority of cervical teratomas in the newborn are histologically benign and diagnosed on antenatal ultrasound. The extent of such tumours and their relationship to vital structures such as major blood vessels and the trachea are better delineated with magnetic resonance imaging (MRI). A case of cervical teratoma imaged antenatally with MRI for assessment of airway patency and surgical planning is reported.

Key Words: teratoma; magnetic resonance imaging; computed tomography; pregnancy

CASE REPORT

A 27 year old woman, G5P2, was admitted with rapidly increasing polyhydramnios at 34 weeks gestation. Antenatal ultrasound revealed a 35 week foetus with a large solid neck mass and associated polyhydramnios. Antenatal MRI was performed to assess tracheal patency and for surgical work-up with excision being planned for the day after birth.

Coronal T1 and T2-weighted sequences of the pelvis and axial T1 and T2-weighted acquisitions of the foetal mass were performed. MRI demonstrated a single cephalic foetus and polyhydramnios. A well marginated, slightly lobulated solid mass was arising from the left antero-lateral aspect of the foetal neck. The tumour crossed the midline and extended from the floor of the mouth to the level of the thoracic inlet. The tumour appeared separate from the tongue and compressed the laryngopharynx and trachea with the latter being displaced to the right. The spinal column was uninvolved. The tumour was fairly homogeneous in signal intensity, being isointense to muscle on T1 and hyperintense on T2-weighted images. Several curvilinear foci of signal void were present within the mass and were subsequently shown on computed tomography (CT) to be due to calcification (Figs. 1&2). A diagnosis of cervical teratoma was made.

After delivery of a 3380 gram female, initial attempts at intubation were unsuccessful. A large tumour was arising from the left antero-lateral aspect of the neck and extended under the jaw into the face, over the chest wall, and across to the right side of the neck. Bronchoscopy revealed that the trachea was rotated and markedly displaced to the right. There was a degree of tracheomalacia involving the upper third of the trachea where the tumour was causing compression.

CT scan performed pre-operatively confirmed a multiloculated mass arising from the left side of the neck extending superiorly to the skull base and inferiorly to the thoracic inlet. The tumour was heterogeneous in attenuation with multiple flecks of calcification. The mass displaced the laryngopharynx and upper trachea

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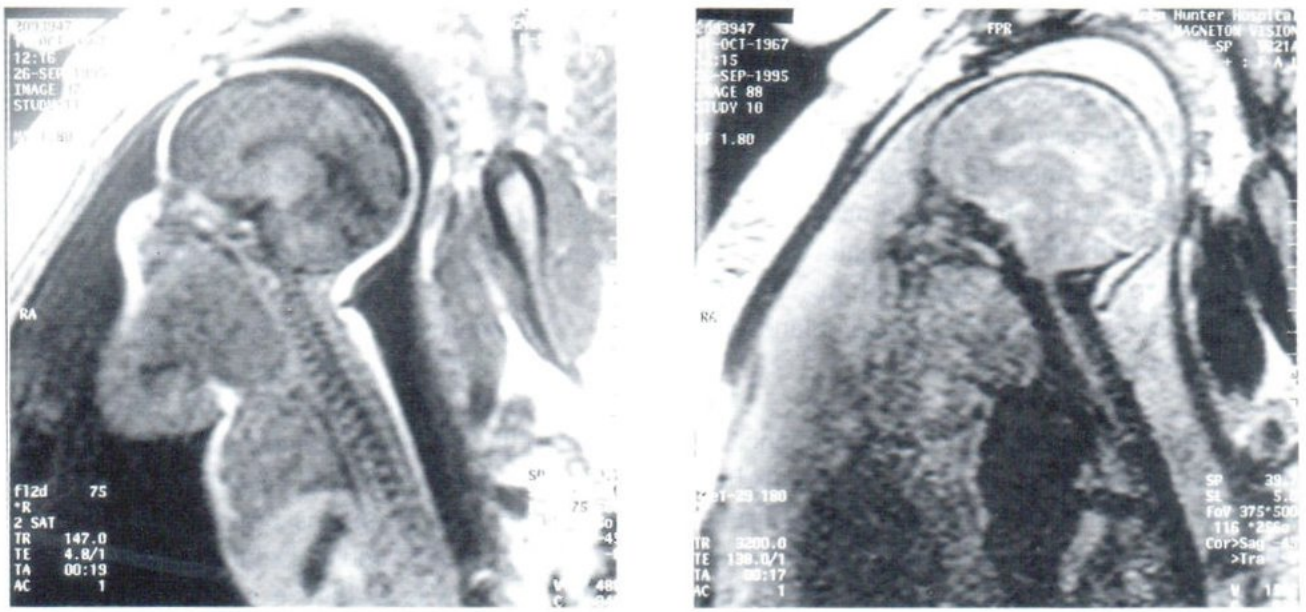
to the right (Figs. 3a&3b).

At surgery the tumour was well encapsulated and extended to the right of midline from the left side of the neck as well as posterior to the thyroid gland, displacing it anteriorly. The mass did not appear to be infiltrating the gland and measured 100x70x60 cm. The tumour extended superiorly to the base of the skull and was retracted at operation without difficulty but was densely adherent to the left thyroid lamina.

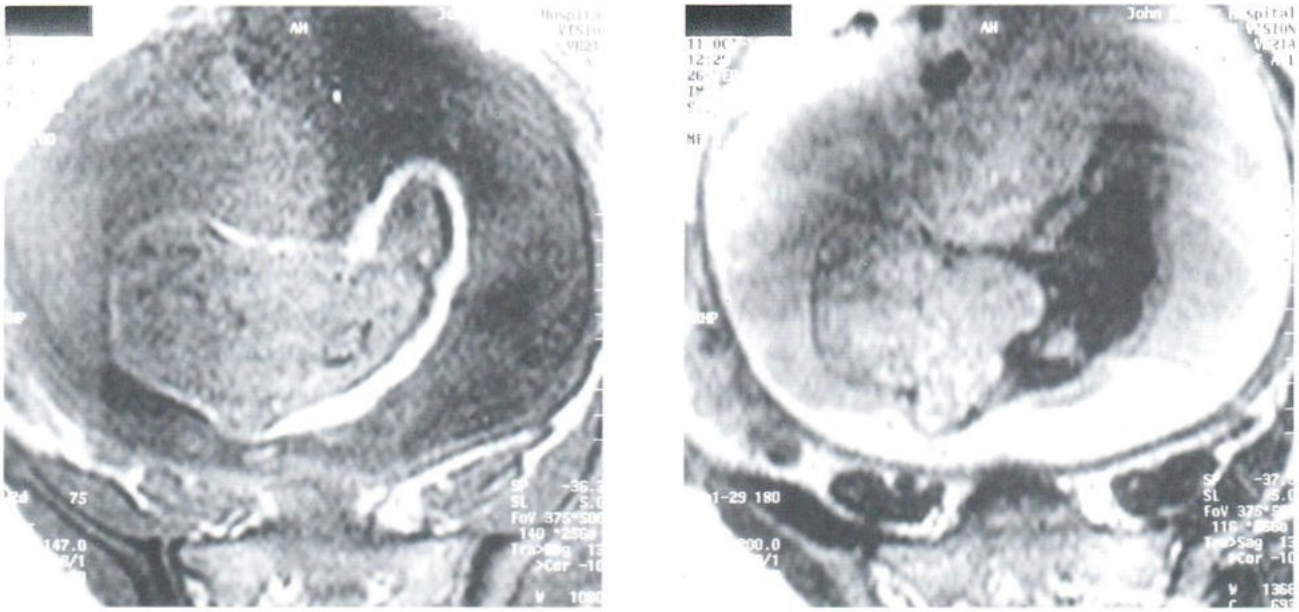
Macroscopically, the tumour was composed of solid and cystic components. It was firm with areas of palpable calcification.

Histologically, bone, cartilage, mucin-containing epithelium, neural tissue with varying degrees of maturity and immature neuroectodermal tissue were present.



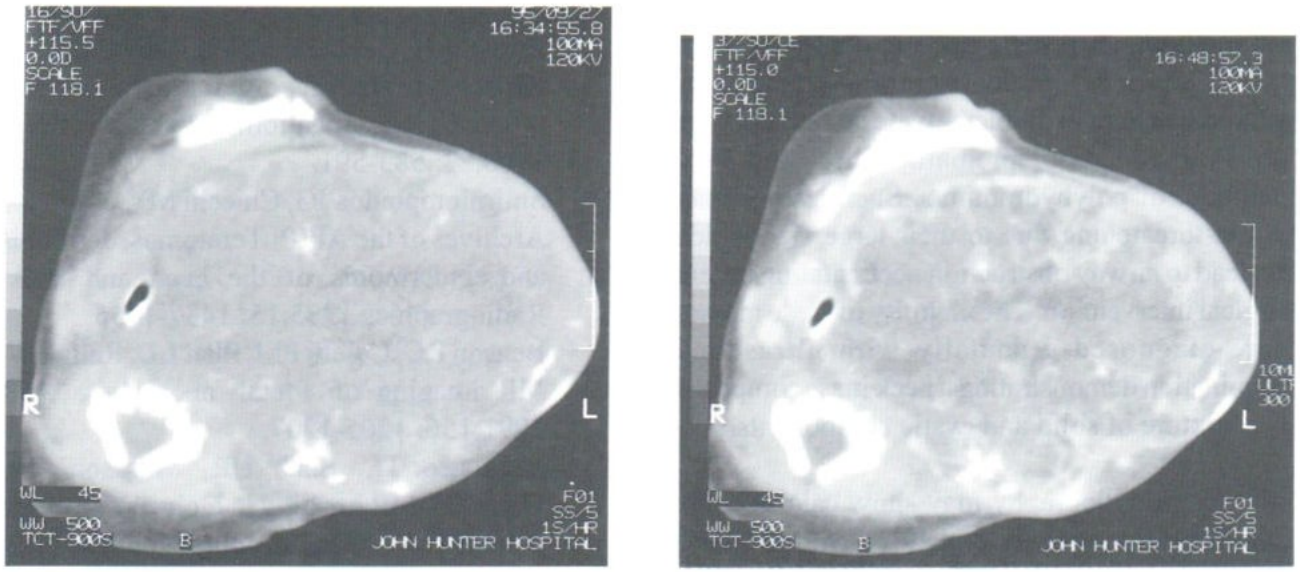
1(a) 1(b)

Fig. 1. T1-weighted (a) and T2-weighted (b) sagittal images demonstrate an inhomogeneous, well-circumscribed mass producing mass effect on the adjacent laryngopharynx and trachea.



2(a) 2(b)

Fig. 2. T1-weighted (a) and T2-weighted (b) axial images demonstrate a large lobulated mass arising from the left anterolateral aspect of the foetal neck. Curvilinear signal void represents calcification.



3(a) 3(b)

Fig. 3: Pre-contrast (a) and post-contrast (b) CT scans demonstrate a multiloculated, enhancing, heterogeneous mass extending from the mandible to the spine and displacing the hypopharynx.

DISCUSSION

Cervical teratomas are neoplasms arising from ectopic embryologic germ cells. They are composed of tissue from two or more embryonic layers. In adults they are typically small masses with a high incidence of malignancy. In contrast, the majority of cervical teratomas in the newborn are histologically benign and are usually large, bulky masses with variable location. Laterally positioned tumours frequently cross the midline and can extend caudally into the superior mediastinum and cranially into a submandibular location with involvement of the floor of the mouth. Giant tumours can encompass the entire neck and may be larger than the foetal head.

Conditions reported in association with cervical teratomas include imperforate anus, chondrodystrophia fetalis and hypoplastic left ventricle associated with a small mitral valve orifice and pulmonary hypoplasia.[1]

In 1988, Jordan et al[1] reviewed the literature and including 5 of their patients reported a total of 217 cases of cervical teratomas. Tumours greater than 8cm in diameter were associated with a 59% incidence of premature birth and 49% incidence of polyhydramnios. Such lesions may be life-threatening due to their large size which can lead to airway obstruction necessitating urgent surgical intervention. The majority of these masses were diagnosed prenatally with ultrasound examination demonstrating a neck mass composed of a mixture of solid and cystic components.

Plain radiography may show calcification. Computed tomography typically demonstrates a multiloculated, heterogeneous mass with calcification and/or scattered lipid foci. Differential diagnoses for a large neck mass either in a foetus or infant include cystic hygroma, congenital goitre, lymphangioma, dermoid cyst and neuroblastoma. Teratoma is suspected on MRI when a multiloculated lesion with focal areas of high signal intensity is seen on a T1-weighted study.[2]

Although these foetal anomalies are usually detected sonographically during pregnancy, MR imaging is advantageous because of its large field of view and multi-parameter variability of tissue contrast. MRI is superior in depicting tumour extent and airway compromise. Disadvantages of MRI include expense and a relatively long acquisition time resulting in movement artifact.

Although oligohydramnios and maternal sedation reduces movement, neither will entirely eliminate it.[3-5] Foetal movement is less of a problem in later pregnancy especially if the foetus is markedly abnormal.

REFERENCES

1. Jordan RB, Gauderer MWL. Cervical Teratomas: An analysis - literature review and proposed classification. J Paediatr Surg. 1988;23: 583-591.
2. Smirniotopoulos JG, Chiechi MV. From the Archives of the AFIP: Teratomas, dermoids and epidermoids of the head and neck. Radiographics 1995;15: 1437-1455.
3. Benson RC, Coletti PM, Platt LD, Ralls PW. MR imaging of foetal anomalies. AJR 1991;156: 1205-1207.
4. Angtuaco TL, Shah HR, Mattison DR, Guirk JG. MR imaging in high-risk obstetric patients: A valuable complement to US. Radiographics 1992;12: 91-109.
5. Williamson RA, Weiner CP, Yuh WTC, Abu-Yousef MM. Magnetic resonance imaging of anomalous foetuses. Obstet Gynecol. 1989;73: 952-956.