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Case Report

Mature placental teratoma, fetiform type: a rare case report

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ABSTRACT

A placental teratoma is a rare benign tumor of germ cell origin. Fewer than 50 cases have been reported worldwide. The fetiform variant poses a diagnostic challenge in distinguishing it from acardius amorphus, as it resembles fetal structures without true axial organization. Here we present a case of mature placental teratoma, fetiform type, in a 34-year-old G2P1L1 woman who delivered a healthy male infant at term via uncomplicated vaginal delivery. Post-delivery, a 7.0×6.5×3.5 cm hairy mass was identified on the fetal surface of placenta, supplied by placental vessels without Wharton's jelly or an umbilical cord. The tumor was not reported on antenatal scans. On Gross examination, a heterogeneous solid mass with yellowish areas and few bony components was identified; histopathology confirmed mature tissues from all three germ layers, including ectoderm, mesoderm, endoderm, without immature, malignant, or any organized fetal structures. Due to absent axial skeleton, polarity, and segmentation diagnosis favours teratoma over acardius amorphus. Etiology suggests aberrant migration of germ cells between amnion and chorion. There were no adverse neonatal or maternal outcomes in our case. This case report adds to the limited literature of placental teratoma.

Keywords: Placental teratoma, Acardius amorphus, Germ cell tumor

INTRODUCTION

The placental teratomas is an extremely rare non-trophoblastic benign tumour of germ cell origin, first described in 1925 by Morville and subsequently detailed by Fox and Butler-Manuel in 1964.[1,2] These mature neoplasms typically present as heterogeneous masses on the fetal surface of the placenta, often between the amnion and chorion, and are composed of tissues derived from all three germ cell layers.[3-5] On prenatal imaging, they appear as complex lesions with variable echogenicity, including areas of fat, calcification, and fluid, which can mimic other placental masses.[6] Recent review highlights fewer than 50 documented cases worldwide, emphasising its rarity and the challenges faced in its diagnosis.[5] The fetiform variant, is characterized by highly organized fetus-like structures, which raises particular diagnostic difficulty, as it must be differentiated from acardius amorphus (a malformed monozygotic twin) through features such as absence of an umbilical cord, lack of axial skeletal organization, and if possible DNA genotyping to confirm separate zygosity.[7-9]

We report a case of mature placental teratoma of the fetiform type, adding to this limited literature.

CASE REPORT

A 34-year-old woman, G2P1L1, presenting with 40 weeks and 2 days period of gestation, had an uncomplicated normal vaginal delivery of a healthy male infant weighing 3500 grams, with APGAR score of 8/10 at 1 and 5 minutes. The placenta and membranes were delivered spontaneously. After delivery of the placenta, a mass covered with hair, resembling a fetal head, was found attached to the fetal surface of placenta. This mass was located between the amnion and chorion and received its blood supply from the placental vessels. It was not surrounded by Wharton's jelly. The mass was not detected during prenatal ultrasound examinations.

On gross examination, there is a single placenta weighing 520 grams, 14×14 cm in diameter and 3.5 cm in thickness, having intact membranes and an umbilical cord. The cord

was inserted eccentrically, measuring 34 cm in length, and on cross section it contained two arteries and one vein. The mass was found attached to the fetal surface of the placenta, measuring 7.0×6.5×3.5 cm and was covered by fetal membranes; the external surface of the mass was noted to have hair (Figure 1). On cut-section, the mass showed yellowish areas and bony components, but no recognizable fetal tissue was identified (Figure 2).

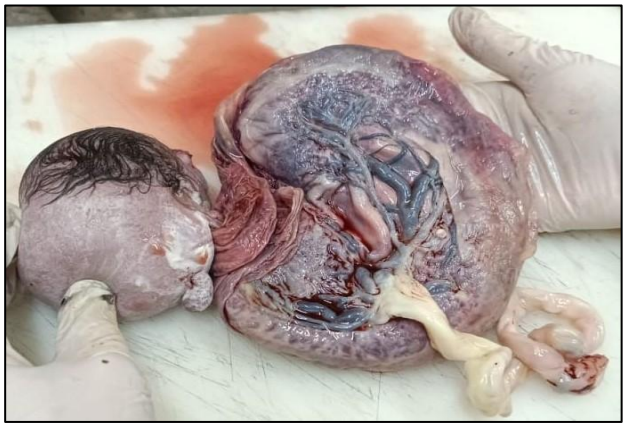

Figure 1: Mass covered with hair attached to fetal surface of placenta.

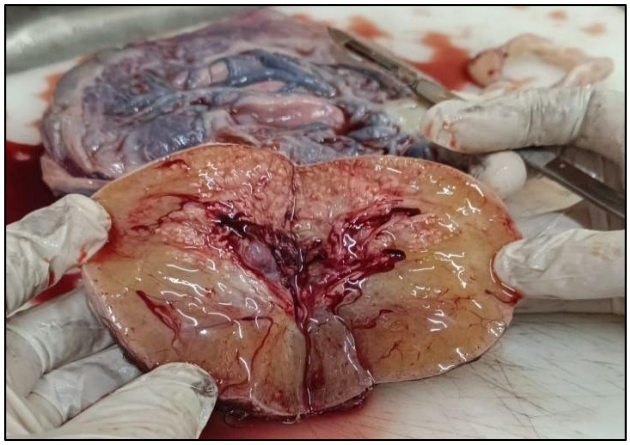

Figure 2: Cut section of yellowish and bony areas.

On microscopic examination, sections from the mass attached to placental membranes show a tumor composed of mature well differentiated tissues derived from all the 3 germ layers seen as: adipose tissue, brown fat, nerve bundles with ganglion cells, blood vessels, smooth muscle bundles, skeletal muscle bundles, hyaline cartilage, mature bony trabeculae, lining of stratified squamous epithelium with pilosebaceous units, pseudostratified ciliated columnar epithelium, pancreatic tissue, small intestinal tissue, colonic epithelium, uveal tissue, and choroid plexus. Occasional rosette like arrangements identified with mature appearing neuro-ectodermal tissue.

No attachment to fetal tissue identified. No immature neuro-ectoderm, atypical mitotic activity, malignant germ cell tumor components, vertebral axis, axial skeleton organization, embryologic segmentation, fetal organ arrangement, features suggestive of fetus in fetu, parasitic twin identified in the sections examined.

Based on the above findings a diagnosis of 'Mature placental teratoma, fetiform type' was made.

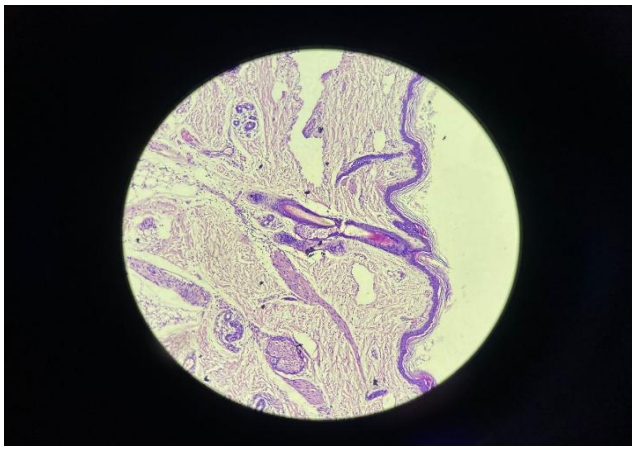

Figure 3: Keratinized stratified squamous epithelium with pilosebaceous units.

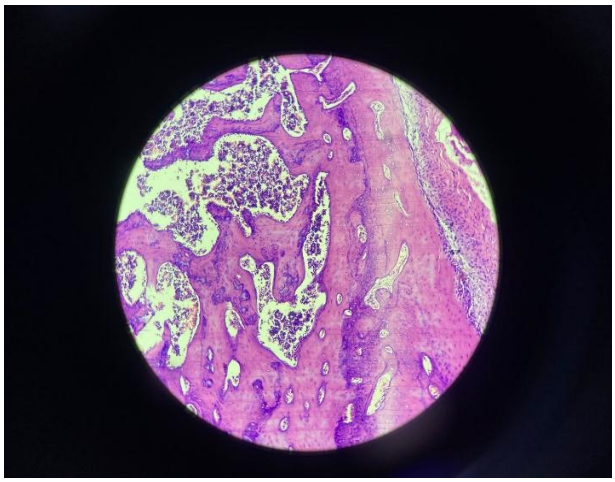

Figure 4: Benign cortical and medullary bone.

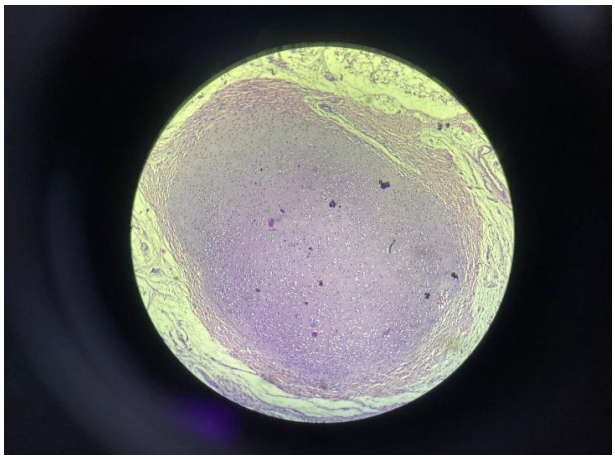

Figure 5: Benign cartilage.

DISCUSSION

Placental teratomas are really uncommon benign tumors, with the fetiform variant representing a subset characterized by partial organization resembling fetal structures but lacking true axial skeletal development or functional anatomy.[1-3] In this case, we're looking at a mature teratoma made up of fully developed tissues from all three germ layers-ectodermal elements like stratified squamous epithelium with hair follicles and sebaceous glands, uveal tissue, choroid plexus, and neuro-ectodermal rosettes; mesodermal elements including adipose tissue, brown fat, nerve bundles with ganglion cells, blood vessels, smooth and skeletal muscle, hyaline cartilage, and mature bony trabeculae; and endodermal components such as pseudostratified ciliated columnar epithelium, pancreatic tissue, small intestinal tissue, and colonic epithelium. There's no sign of immature components, atypical mitoses, or malignant features confirming its maturity and benign nature, just like what has been described in earlier studies.[2-4] What's interesting is that the mass sat between the amnion and chorion on the fetal side, which is typical for these tumors, and on close inspection, it had visible hair and bony areas on cross-section, matching the heterogeneous appearance mentioned in other reports.[5,6]

A major hurdle in diagnosis is telling a placental teratoma apart from fetus acardius amorphus-sometimes called acardius amorphous-which is basically a malformed monozygotic twin caused by vascular anastomosis or primary cardiac agenesis in a multiple pregnancy.[2,7,8] Like Fox and Butler-Manuel pointed out, teratomas stand out because they don't have an umbilical cord (which is usually there, even if basic or fully formed, in acardius cases) and there's a lack of tissue organization, such as recognizable cranial/caudal polarity, vertebral column, ribs, pelvis, or skull base.[2] In this particular case,no umbilical cord was identified, and histological examination revealed no vertebral axis, skeletal structure, embryonic segments, or arranged fetal organs, which points to it being a teratoma instead of a acardius amorphus.[7,8] This distinction is further backed by the tumor's vascular supply from branches of major fetal arteries on the placental surface, without any link to the primary fetus, as seen in acardius cases.[2,9] Several authors, including Smith and Pounder, have suggested that placental teratomas may represent an extreme form (or variant) of acardius amorphus. They pointed to features such as a radial pattern of tissue organization and the absence of a clear capsule, which they considered inconsistent with a true neoplastic process.[2] Nevertheless, this interpretation remains debated. The majority of reported cases-including those that meet the conventional diagnostic criteria for placental teratoma-favor a distinct entity with a germ cell-derived neoplastic origin, rather than positioning it as part of a spectrum of twinning disorders.[2,3,9] In cases where diagnostic uncertainty persists, genetic studies such as DNA genotyping or fingerprinting offer a more definitive approach. These methods can distinguish the two entities by demonstrating separate zygosity (genetic individuality) in true teratomas, in contrast to the shared monozygotic genetics typically seen in acardiac (amorphous) twins.[9,13] Although such analysis was not performed in the present case, recent literature underscores its value in clarifying ambiguous diagnoses.[9,13]

The origin of placental teratomas continues to be a subject of debate, though it is generally thought to involve aberrant primordial germ cells.[2,3] Embryological evidence indicates that germ cells arise from the yolk sac endoderm during the third week of gestation, then migrate along the hindgut mesentery toward the genital ridge.[2,10] In this migration, the temporary evagination of the primitive gut into the umbilical cord-lasting until the fourth month-may enable misplaced germ cells to travel through the cord's connective tissue and settle in the extraplacental membranes between the amnion and chorion.[2,3] This mechanism accounts for the tumor's characteristic location and aligns with theories of parthenogenetic development or fusion from haploid germ cells, as supported by nuclear sex chromatin analyses in extragonadal teratomas.[2,11] Alternatively, Joseph and Vogt proposed that germ cell nests might be directly displaced into the placenta due to the early close proximity of the yolk sac to placental precursors, bypassing migration altogether; however, this view falls short in explaining the tumor's consistent positioning at the amnio-chorionic interface.[4] In fetiform cases such as the one we describe, the partial fetus-like structure could represent advanced differentiation of these germ cells, though it lacks the organized polarity seen in true parasitic twins or fetus in fetu.[7,14,15]

From a clinical standpoint, placental teratomas are frequently discovered incidentally at delivery, as occurred in our patient, where routine prenatal ultrasounds missed the mass entirely.[6,16] This highlights the challenges of antenatal detection, as these tumors often present on imaging as complex cystic-solid masses with calcifications but can mimic other placental conditions, such as chorioangiomas or hematomas.[5,6,17] In the majority of instances, including ours, the pregnancy proceeds without complications, posing no harm to the fetus or mother, although isolated reports have linked them to fetal anomalies like hypospadias or to polyhydramnios.[3,18,19] Management is generally conservative, with thorough excision and examination of the placenta postpartum being adequate, given the benign nature and lack of recurrence.[5,20] A survey of the existing literature identifies fewer than 50 reported cases, with fetiform variants being particularly uncommon; our case contributes to this limited series, emphasizing the role of histopathological evaluation in confirming the diagnosis.[2,3,5,21,22]

CONCLUSION

This case of a mature placental teratoma of the fetiform type illustrates the tumor's likely germ cell origin, key diagnostic features, and benign nature. Distinguishing it

from acardius amorphus depends primarily on morphological characteristics, with potential contributions from genetic analysis. There were no adverse fetal and maternal outcomes in our case.

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