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(CASE REPORT)

Second-trimester diagnosis and multidisciplinary management of fetal sacrococcygeal teratoma: A case report with favorable perinatal outcome

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Abstract

Background: Sacrococcygeal teratomas (SCTs) are rare congenital tumors arising from totipotent germ cells, most located at the base of the coccyx. Although typically benign, their variable morphology, vascularity, and growth pattern may pose significant perinatal risks, including high-output cardiac failure, fetal hydrops, and dystocia. Early diagnosis and structured prenatal monitoring are critical for optimizing neonatal outcomes.

Case Presentation: We report the case of a 37-year-old primigravida in whom a mixed-type SCT was diagnosed at 22+2 weeks of gestation during routine anomaly scanning. Fetal MRI confirmed a predominantly exophytic, cystic-solid mass without spinal involvement. Serial ultrasounds showed progressive tumor growth (from 32 × 35 mm to 104 × 68 mm), yet Doppler indices and fetal biometry remained within normal limits. Invasive genetic testing (amniocentesis with array-CGH) revealed a normal female karyotype, and no additional anomalies were detected. Elective cesarean delivery was planned to minimize intrapartum complications. Postnatal surgical resection was completed successfully within 24 hours of life. Histology confirmed a mature teratoma, and postoperative recovery was uneventful.

Conclusion: This case underscores the importance of timely prenatal imaging, comprehensive genetic evaluation, and coordinated multidisciplinary care in the management of SCTs. Even in cases of rapid tumor growth, conservative prenatal management can lead to excellent neonatal outcomes when key risk factors are absent. The continuous involvement of specialized midwives—particularly in counseling and emotional support, complements the roles of physicians and surgeons, reinforcing the value of an integrated team-based approach to complex fetal conditions.

Keywords: Sacrococcygeal teratoma; Fetal tumor; Prenatal diagnosis; Fetal MRI; Amniocentesis; Multidisciplinary care

1. Introduction

Sacrococcygeal teratomas (SCTs) are rare congenital neoplasms originating from totipotent germ cells, most often located at the base of the coccyx, in the region of Hensen's node during embryogenesis. These tumors represent the most common tumors in neonates and fetuses, with an estimated incidence of 1 in 20,000 to 40,000 live births, and a predominant female-to-male ratio of 4:1, underscoring a potential gender-linked predisposition (1,2).

Clinically, SCTs exhibit wide heterogeneity in terms of size, growth pattern, internal structure (solid, cystic, or mixed), and vascularization. These characteristics directly influence both prognosis and management. Larger tumors, especially those with high vascularity, are associated with increased perinatal morbidity and mortality, largely due to high-output

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cardiac failure, fetal hydrops, and polyhydramnios. Furthermore, large exophytic masses can mechanically compress pelvic organs, leading to urinary or gastrointestinal obstruction, or dystocia during labor (2).

From a diagnostic perspective, prenatal ultrasound remains the cornerstone for early detection, often as early as the first trimester, while fetal MRI provides superior delineation of internal tumor structure and anatomical relationships, guiding surgical planning and decision-making (2).

The management of SCTs requires a multidisciplinary approach involving maternal-fetal medicine specialists, radiologists, neonatologists, pediatric surgeons, and geneticists. Prenatal counseling plays a critical role in preparing the expectant parents for potential outcomes and surgical interventions.

In this report, we present a case of a sacrococcygeal teratoma diagnosed during the second trimester of pregnancy in a 37-year-old primigravida woman. This case underscores the value of vigilant prenatal surveillance and a coordinated multidisciplinary approach, illustrating how even large SCTs can result in favorable perinatal outcomes when managed appropriately.

2. Case Presentation

A 37-year-old gravida 2, para 0 woman presented for routine prenatal care at 6 weeks gestation. She had a history of one prior spontaneous abortion, no known chronic diseases, and a spontaneous conception.

At 13+0 weeks of gestation, the patient underwent first-trimester combined screening, which included nuchal translucency (NT) measurement, PAPP-A testing, and detailed assessment of fetal anatomy. The overall risk for trisomies 13, 18, and 21 was assessed as low risk. Importantly, the fetal anatomy was evaluated and found to be normal for the gestational age.

At 22+2 weeks, during the routine second-trimester anomaly scan, a well-defined sacrococcygeal mass measuring 32 × 35 mm was noted protruding posteriorly from the fetal pelvis, in the midline and caudal to the spine (Figure 1). The mass exhibited predominantly solid echogenicity with mixed internal characteristics, suggestive of a type I or II sacrococcygeal teratoma (SCT). No other fetal anomalies were present.

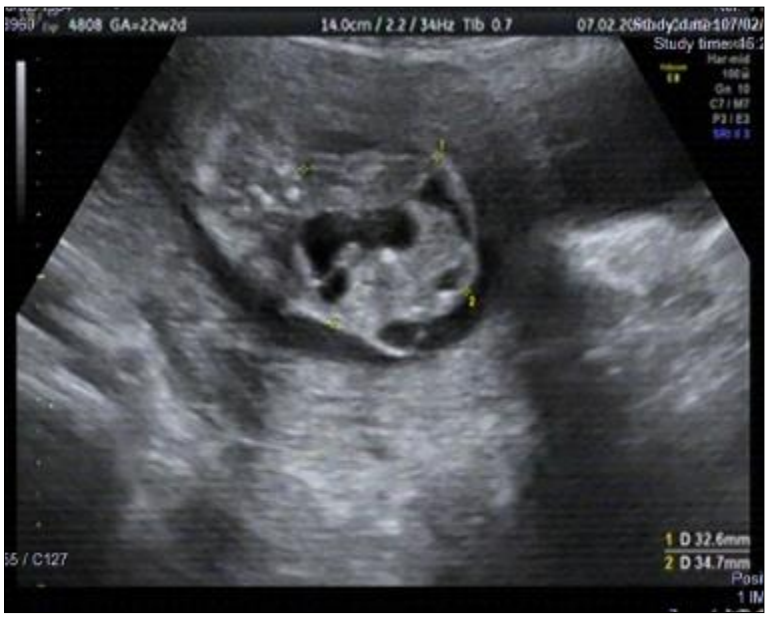

Figure 1 Sacrococcygeal mass measuring 32 × 35 mm at 22 weeks

Fetal MRI performed at 22+5 weeks of gestation confirmed the presence of a mixed-type sacrococcygeal teratoma, with both cystic and solid components. The lesion demonstrated exophytic growth originating from the presacral area, with no extension into the spinal canal and no evidence of a tethered cord. While the mass caused compression of nearby pelvic structures, including the rectum and bladder, there was no sign of tissue invasion. Additionally, no ascites, hydrops fetalis, or features suggestive of high-output cardiac failure were observed.

Serial ultrasound examinations were subsequently performed to monitor tumor progression, which showed steady growth from 39 × 44 mm at 23+3 weeks to 104 × 68 mm at 31+5 weeks. Despite the increase in size, there were no signs of fetal distress, hydrops, or polyhydramnios, and fetal biometry remained within the 5th to 38th percentiles.

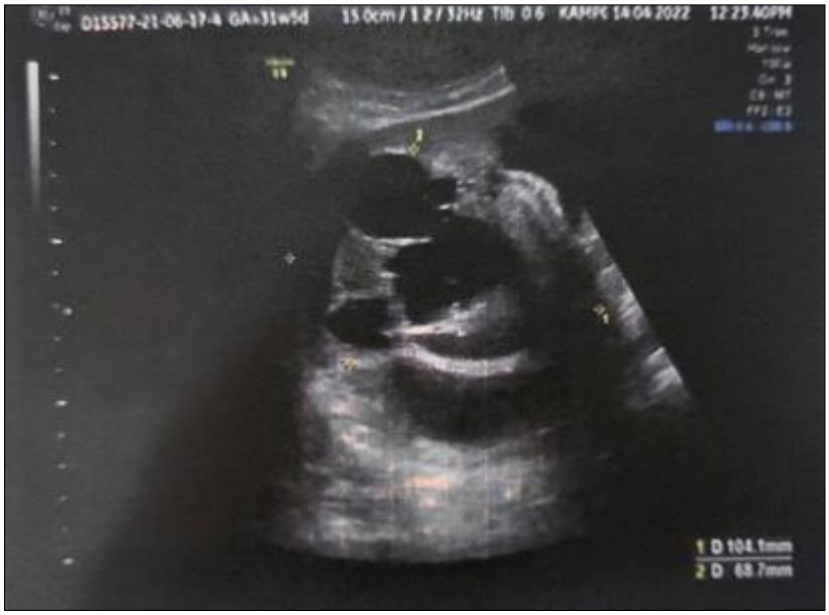

Figure 2 Sacrococcygeal mass measuring 104 × 68 mm at 31+5 weeks

A fetal echocardiogram conducted at 27+4 weeks demonstrated a structurally normal heart, with no pericardial effusion, valvular regurgitation, or functional impairment.

Invasive genetic testing via amniocentesis and array-CGH at 24+3 weeks revealed a normal female karyotype with no chromosomal abnormalities or pathogenic copy number variations. Subsequent growth scans did not reveal any structural anomalies in the fetal brain, kidneys, or gastrointestinal system. Throughout the monitoring period, Doppler indices of the umbilical artery, middle cerebral artery, and uterine arteries remained within normal limits, and both the amniotic fluid volume and placental morphology were appropriate for gestational age.

3. Delivery Planning and Outcome

In multidisciplinary consultation (obstetrician, maternal-fetal medicine specialist, pediatric surgeon, neonatologist), elective cesarean delivery was scheduled to avoid tumor rupture or traumatic delivery complications.

Postnatal surgical resection of the tumor was successfully performed within the first 24 hours of life. Histopathological analysis confirmed a mature teratoma with no malignant features. The neonate recovered uneventfully and was discharged in good condition. Follow-up assessments over the subsequent months showed no signs of recurrence or neurological impairment. A photograph taken postoperatively demonstrates the surgical incision following tumor excision, showing appropriate wound closure and healing (Figure 3). This visual evidence further supports the uneventful postoperative course and absence of early surgical complications.

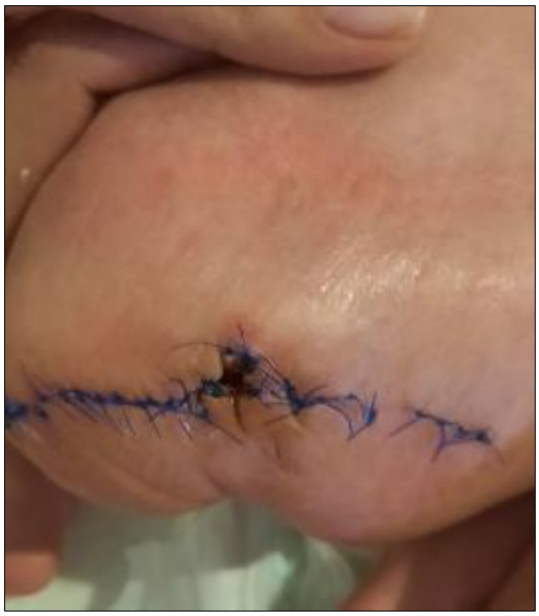

Figure 3 Postoperative View of Surgical Site Following Sacrococcygeal Teratoma Resection

4. Discussion

Sacrococcygeal teratomas (SCTs) are rare congenital tumors arising from totipotent germ cells located near Hensen's node. Although histologically benign in the majority of prenatal cases, SCTs can lead to significant perinatal morbidity and mortality depending on their size, vascularity, growth pattern, and anatomical involvement (3,4).

In the present case, a mixed-type SCT was diagnosed in the mid-second trimester in a 37-year-old primigravida. The tumor was primarily exophytic, with minimal pelvic extension, and was managed conservatively through vigilant monitoring, culminating in favorable neonatal and surgical outcomes. This case illustrates multiple critical principles outlined in the current literature.

Although most SCTs are diagnosed during the second trimester, advances in prenatal ultrasound have enabled first-trimester detection in experienced centers (5). In our case, the tumor was first identified at 22+2 weeks, which is consistent with reports indicating that most SCTs are detected during the anomaly scan window (5).

Fetal MRI is now regarded as the gold standard for evaluating SCTs. It provides superior anatomical resolution, particularly for assessing intrapelvic or spinal involvement, and aids in surgical planning (6). In our case, MRI confirmed the absence of spinal canal invasion and tethered cord, allowing for an exclusively pediatric surgical approach, without neurosurgical intervention.

Prognostic models in the literature emphasize tumor size (>5 cm), growth velocity, internal structure, and vascularity as key risk factors (7). Larger, solid, and highly vascular tumors are associated with complications such as high-output cardiac failure, hydrops fetalis, and preterm delivery (5,7).

In this case, the tumor exhibited rapid growth, from 32 mm to 104 mm over nine weeks, yet Doppler studies remained normal, and there were no signs of fetal compromise, suggesting a low-risk SCT, despite its dimensions. Some studies suggest using tumor volume-to-fetal weight ratio (TFR) as a quantitative risk index (8), although this was not calculated here due to stable fetal condition.

While SCTs are generally isolated anomalies, they may occasionally be associated with other congenital malformations involving the genitourinary, gastrointestinal, or spinal systems. Prenatal genetic evaluation, including invasive testing such as amniocentesis, is often recommended in cases of fetal tumors to exclude chromosomal abnormalities, even when the malformation appears isolated. In this case, both conventional karyotyping and array-comparative genomic hybridization (array-CGH) were performed following amniocentesis at 24+3 weeks and revealed a normal female chromosomal profile, with no evidence of pathogenic copy number variations. Subsequent detailed ultrasound and MRI

assessments showed no additional fetal anomalies. This aligns with current evidence suggesting that the majority of prenatally diagnosed sacrococcygeal teratomas are chromosomally normal (5).

The Altman classification system, which stratifies SCTs into four types based on their anatomical extent, remains a clinically valuable tool in predicting both surgical complexity and long-term outcomes (9). Type I and II tumors, which are mainly external or have minimal intrapelvic extension, like in our patient, have a lower malignancy risk and generally favorable surgical outcomes (5,9).

Given the tumor's size and exophytic presentation, elective cesarean section was planned to avoid intrapartum tumor rupture or hemorrhage, consistent with current recommendations for large or vascular SCTs (10). This mode of delivery also facilitated immediate postnatal resection under controlled surgical conditions.

Optimal management of sacrococcygeal teratomas requires a coordinated multidisciplinary approach involving maternal-fetal medicine specialists, pediatric surgeons, neonatologists, geneticists, radiologists, and specialized midwives. As highlighted in recent literature (11), structured prenatal counseling delivered through multidisciplinary teams significantly enhances parental understanding, emotional preparedness, and informed decision-making when facing complex fetal anomalies. In the present case, collaborative care was pivotal in facilitating accurate diagnosis, individualized surveillance, and comprehensive perinatal planning, while also providing the family with psychological support and realistic expectations.

5. Conclusion

Prenatal detection of sacrococcygeal teratomas enables timely risk assessment, individualized management, and strategic perinatal planning. Although these tumors can pose serious complications, favorable outcomes are achievable through accurate imaging, genetic evaluation, and multidisciplinary coordination. This case demonstrates that even rapidly growing SCTs may be managed conservatively with careful surveillance, leading to successful postnatal surgical resection and excellent neonatal prognosis. Continued collaboration among maternal-fetal specialists, pediatric surgeons, and neonatologists remains essential for optimizing outcomes in complex fetal anomalies such as SCT.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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