WJPMR, 2026, 12(7), 280-283 **Case Report** **Impact Factor: 7.533**

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

ISSN (O): 2455-3301
ISSN (P): 3051-2557
Coden USA: WJPMBB

FETAL SACROCOCCYGEAL TERATOMA ASSOCIATED WITH POLYHYDRAMNIOS AND PRETERM LABOR: PRENATAL DIAGNOSIS, MANAGEMENT, AND OUTCOME

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DOI: https://doi.org/10.5281/zenodo.20963029

How to cite this Article: *Samia Dagdag, Arwa Aboumedian, Nassima Ouguerzi, Hounaida Mahfoud, Samir Bargach (2026). Fetal Sacrococcygeal Teratoma Associated With Polyhydramnios And Preterm Labor: Prenatal Diagnosis, Management, And Outcome. World Journal of Pharmaceutical and Medical Research, 12(7), 280-283.

Article Received on 29/05/2026 **Article Revised on 19/06/2026** **Article Published on 01/07/2026**

ABSTRACT

Fetal sacrococcygeal teratoma (SCT) is the most common congenital tumor diagnosed in the fetus and neonate. Although frequently benign on histology, prenatal SCT may be associated with severe complications, including polyhydramnios, preterm labor, fetal hydrops, and high-output cardiac failure. We report the case of a 27-year-old gravida 2, para 1 woman referred at 21 weeks of gestation for suspected fetal SCT. Prenatal ultrasound and magnetic resonance imaging confirmed a large predominantly exophytic sacrococcygeal mass. The pregnancy was complicated by progressive polyhydramnios and spontaneous preterm labor at 33 weeks of gestation, leading to cesarean delivery. A live female neonate was delivered, but the tumor ruptured during delivery. Despite neonatal intensive care and surgical excision on the second day of life, the newborn died 48 hours after surgery following postoperative sepsis. This case highlights the potentially severe perinatal course of fetal SCT, particularly when associated with polyhydramnios and preterm labor. Tumor size, vascularity, fetal hemodynamic status, and gestational age at delivery are key prognostic factors. Early diagnosis, close antenatal surveillance, multidisciplinary planning, and prompt postnatal management remain essential to optimize outcomes.

KEYWORDS: Fetal sacrococcygeal teratoma; fetal tumor; polyhydramnios; preterm labor; prenatal diagnosis; case report.

INTRODUCTION

Sacrococcygeal teratoma (SCT) is a rare congenital neoplasm arising from pluripotent cells in the caudal embryonic region. It is considered the most common tumor diagnosed in the fetus and neonate.[1] Histologically, most SCTs are mature teratomas and belong to the spectrum of germ cell tumors (GCTs). However, SCTs differ biologically from postpubertal gonadal and extragonadal GCTs.[1,6] The estimated incidence is approximately one in 35,000 to 40,000 live births, with a marked female predominance and a reported female-to-male ratio of 3:1 to 4:1.[2,3]

Although most SCTs are histologically benign, their prenatal course may be complicated by significant maternal and fetal morbidity. Reported complications include polyhydramnios, preterm labor, fetal anemia, high-output cardiac failure, and hydrops fetalis.[4] Polyhydramnios is particularly frequent in large or highly vascularized tumors and may result from fetal hyperdynamic circulation, increased transudation across tumor vessels, and impaired fetal swallowing.

The association between fetal SCT, polyhydramnios, and preterm labor has been recognized for decades. One of the earliest reports was published by Van Praagh and Jones, who described a benign fetal SCT complicated by hydramnios and preterm delivery.[5] Despite advances in prenatal imaging and perinatal care, management remains challenging and outcomes remain variable. We report a case of fetal SCT complicated by progressive polyhydramnios, preterm labor, tumor rupture during delivery, and neonatal death despite surgical management.

CASE PRESENTATION

A 27-year-old woman, blood group O Rh-positive, in a non-consanguineous marriage, gravida 2, para 1, with no significant past medical history, was referred to our tertiary care center at 21 weeks of gestation for suspected

fetal SCT identified during a routine ultrasound examination by her primary obstetrician.

Her obstetric history included one previous cesarean delivery for a borderline android pelvis, resulting in the birth of a live neonate. The current pregnancy had otherwise been uneventful until referral. Prenatal laboratory investigations revealed gestational diabetes, while infectious screening and serological tests were negative.

Ultrasound examination at admission confirmed a heterogeneous sacrococcygeal mass with solid and cystic components, consistent with fetal SCT. The amniotic fluid index (AFI) was 23 cm, suggesting increased amniotic fluid volume. Doppler assessment showed increased vascularity within the tumor. Based on the initial ultrasound findings, the lesion was considered type II according to the Altman classification. Close antenatal surveillance was initiated.

Prenatal ultrasound demonstrated a heterogeneous mass arising from the fetal sacrococcygeal region, containing both cystic and solid components. The lesion was clearly delineated from surrounding structures and protruded posteriorly from the fetal pelvis. Color Doppler imaging revealed increased vascularity within the solid component, suggesting a hypervascular lesion. No signs of fetal hydrops were initially observed. Progressive polyhydramnios was subsequently noted, with an AFI of 27 cm at 30 weeks of gestation.

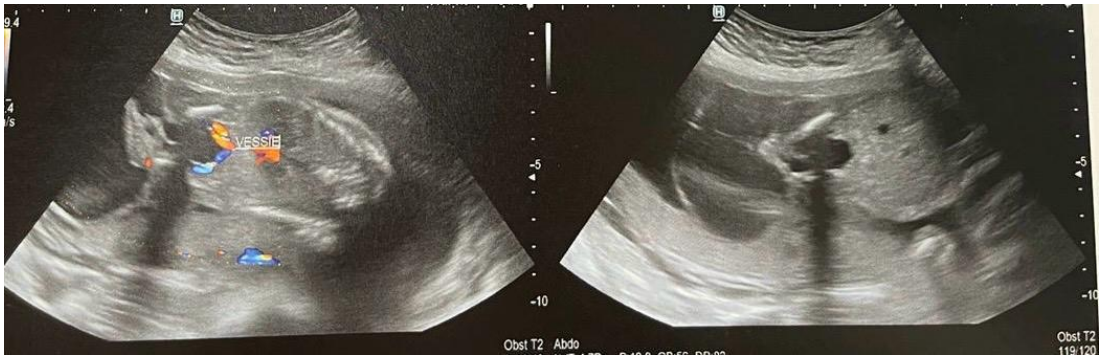

Figure 1: Prenatal ultrasound at 21 weeks of gestation showing a heterogeneous sacrococcygeal mass suggestive of sacrococcygeal teratoma.

Fetal magnetic resonance imaging (MRI) was performed to further characterize the lesion and assess its intrapelvic extension. MRI confirmed a caudal, predominantly cystic, multiloculated mass with pelvi-perineal implantation and dominant exophytic development, measuring 200 x 149 x 160 mm. A solid component was present near the tumor base and measured 56 x 48 x 26 mm. The base extended toward the gluteal region and the roots of the thighs.

Although prenatal ultrasound initially suggested a type II SCT according to the Altman classification, fetal MRI findings were more consistent with a type I lesion because of the predominantly exophytic development and minimal intrapelvic extension. The MRI-based classification was therefore retained for prenatal assessment and perinatal planning.

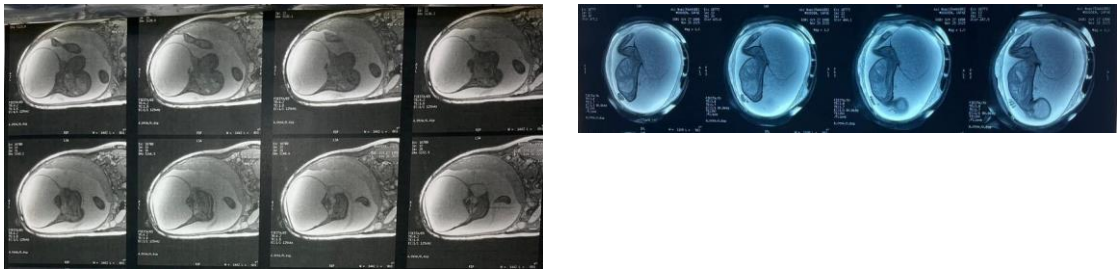

Figure 2: Fetal MRI at 31 weeks of gestation showing a predominantly exophytic sacrococcygeal teratoma consistent with Altman type I, associated with polyhydramnios.

The pregnancy was complicated by progressive polyhydramnios and spontaneous preterm labor at 33 weeks of gestation, leading to cesarean delivery.

A live female neonate was delivered with Apgar scores of 9, 10, and 10 at 1, 5, and 10 minutes, respectively. Unfortunately, the sacrococcygeal tumor ruptured during delivery. The newborn was immediately transferred to the neonatal intensive care unit and managed by the pediatric surgery team. Surgical excision of the tumor was performed on the second day of life. Despite intensive postoperative care, the neonate developed sepsis and died 48 hours after surgery.

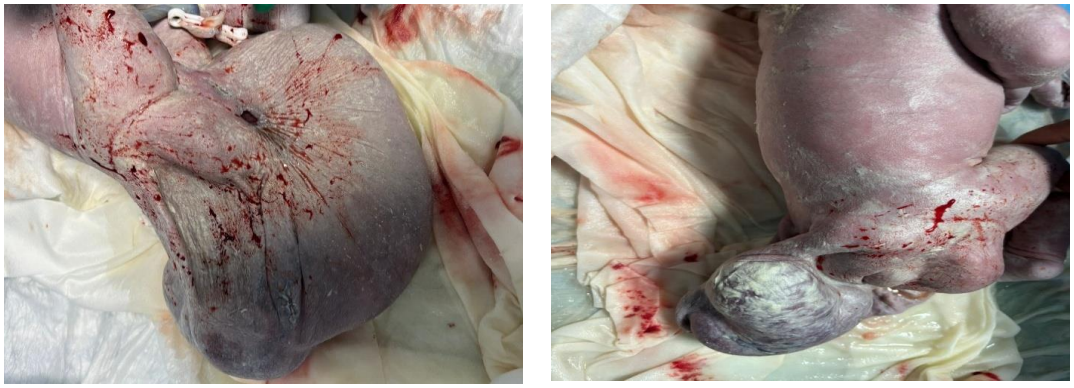

Figure 3: Postnatal images of the newborn with sacrococcygeal teratoma after cesarean delivery: (A) before rupture and (B) after rupture.

DISCUSSION

SCT is the most common congenital tumor diagnosed in the fetus and neonate, with an estimated incidence of approximately one in 35,000 to 40,000 live births and a marked female predominance.[1-3] These tumors contain tissues derived from all three germ layers and are thought to arise from pluripotent cells located near Hensen's node at the caudal end of the embryo, which explains their characteristic sacrococcygeal location.[1]

Although most SCTs are benign on histology, their prenatal evolution may be aggressive because of rapid growth and high vascularity. Hypervascular tumors may function as arteriovenous shunts, leading to fetal hyperdynamic circulation, increased cardiac output, and eventually cardiac failure.[4,7,8] These hemodynamic disturbances may contribute to polyhydramnios and preterm labor.[4,5]

Prenatal diagnosis relies primarily on ultrasound, which is the first-line imaging modality. Ultrasound typically demonstrates a mass arising from the sacrococcygeal region with variable proportions of cystic and solid components. Tumor size, growth rate, composition, and vascularity are important prognostic indicators.[9,10] Color and spectral Doppler imaging are essential for assessing intratumoral vascularity and fetal hemodynamic status. Increased vascularity and low-resistance flow patterns are associated with an increased risk of high-output cardiac failure and hydrops fetalis.[3,4,7]

Fetal MRI provides complementary information, particularly regarding intrapelvic or intra-abdominal extension and the relationship of the tumor to adjacent pelvic organs. It is especially useful for surgical planning, prenatal counseling, and refinement of the Altman classification.[4,11] In the present case, the discrepancy between ultrasound and MRI classification was resolved in favor of MRI because it better characterized the predominantly exophytic tumor development and minimal intrapelvic extension.

The anatomical classification proposed by Altman et al. remains widely used in clinical practice and divides SCTs into four types according to tumor location and extension: type I, predominantly external tumor with minimal or no presacral component; type II, external tumor with significant intrapelvic extension; type III, predominantly intrapelvic or intra-abdominal tumor with a small external component; and type IV, entirely presacral tumor with no external component. This classification has implications for prenatal diagnosis, surgical planning, and prognosis, as tumors with a large internal component are often associated with increased morbidity.[3,4]

Management requires a multidisciplinary approach involving obstetricians, fetal medicine specialists, neonatologists, pediatric surgeons, and anesthesiologists. Close antenatal surveillance should include serial ultrasound examinations to monitor tumor growth, amniotic fluid volume, and fetal well-being. Doppler studies and fetal echocardiography are also recommended to detect early signs of cardiac compromise.[3,12,13]

In selected severe cases, particularly those complicated by hydrops or progressive cardiac failure, fetal intervention may be considered. These approaches aim to reduce tumor vascularity or blood flow and include techniques such as radiofrequency ablation or vascular occlusion. However, indications remain limited, outcomes are variable, and these procedures should be performed only in specialized centers.[14]

The timing of delivery must balance fetal maturity against the risk of worsening prenatal complications. Preterm delivery is frequently required in cases complicated by progressive polyhydramnios or spontaneous preterm labor. Cesarean delivery is often recommended for large external tumors to reduce the risk of tumor rupture and hemorrhage during delivery.[4] Postnatal management consists of early surgical excision, including coccygectomy when feasible, to reduce the risk of recurrence. Neonatal intensive care support is often required, particularly in preterm infants or those with hemodynamic instability.[9,11]

Prognosis depends on multiple factors, including tumor size, vascularity, Altman type, presence of hydrops, fetal

cardiac status, tumor rupture, and gestational age at delivery. Prenatally diagnosed SCT complicated by polyhydramnios and preterm labor is associated with increased perinatal morbidity and mortality.[3,7] In the present case, progressive polyhydramnios, preterm delivery, tumor rupture, and postoperative sepsis were major adverse factors contributing to the unfavorable outcome.

This case underscores the need for early diagnosis, individualized surveillance, careful delivery planning, and rapid coordination between obstetric, neonatal, anesthetic, and pediatric surgical teams. Even with close monitoring and timely multidisciplinary care, the perinatal course of fetal SCT may remain unpredictable.

CONCLUSIONS

Fetal SCT is a rare but potentially life-threatening condition, particularly when associated with prenatal complications such as polyhydramnios and preterm labor. This case illustrates the diagnostic and management challenges posed by a large, vascular tumor and the unpredictable perinatal course despite timely diagnosis and multidisciplinary care.

Early prenatal detection by ultrasound, complemented by Doppler assessment and fetal MRI, is essential for tumor characterization, risk stratification, and perinatal planning. Polyhydramnios and preterm labor should be considered markers of disease severity and poorer prognosis. Although advances in fetal monitoring and surgical management have improved outcomes in selected cases, neonatal morbidity and mortality remain significant, especially when tumor rupture or postoperative complications occur.

Referral to tertiary care centers with expertise in fetal medicine, neonatology, and pediatric surgery is essential. Individualized antenatal surveillance, appropriate timing and mode of delivery, and prompt postnatal surgical management are critical components of care. Further multicenter studies are needed to refine prognostic indicators and optimize prenatal and postnatal therapeutic strategies for fetuses affected by SCT.

Consent

Written informed consent was obtained from the newborn's parents/legal guardians for publication of this case report and the accompanying images. All identifying information has been anonymized to preserve patient confidentiality.

Conflicts of Interest

The authors declare that they have no competing interests.

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