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## A Case of Umbilical Artery Thrombosis in the Third Trimester of Pregnancy

Authors' Contribution:  
Study Design A  
Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
Literature Search F  
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**Conflict of interest:** None declared

**Patient:** Female, 30  
**Final Diagnosis:** Umbilical artery thrombosis  
**Symptoms:** None  
**Medication:** —  
**Clinical Procedure:** Casarean  
**Specialty:** Obstetrics and Gynecology

**Objective:** Unknown etiology





**Background:** Umbilical artery thrombosis is an extremely rare complication during pregnancy. Umbilical artery thrombosis has a poor prognosis and is associated with increased rates of perinatal morbidity, including intrauterine growth restriction (IUGR), and fetal mortality.

**Case Report:** We report a rare case of umbilical artery thrombosis, diagnosed by ultrasound, at 33 weeks gestation in a 30-year-old woman who had previously had an uneventful pregnancy.

**Conclusions:** Umbilical artery thrombosis is a rare complication of pregnancy that is associated with high fetal mortality. Management may include planned elective delivery by cesarean section, following antenatal corticosteroid therapy for fetal lung maturation.

**MeSH Keywords:** Prenatal Diagnosis • Thrombosis • Umbilical Arteries

**Full-text PDF:** <https://www.amjcaserep.com/abstract/index/idArt/906859>

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## Background

Thrombosis of the umbilical artery is associated with increased rates of perinatal morbidity, including intrauterine growth restriction (IUGR), and increased fetal mortality [1–3]. Only a few cases of single arterial umbilical cord thrombosis have been described, and although the mechanism of occurrence is unclear, there are often associated additional cord abnormalities [4]. Previous studies have suggested that cord abnormalities could induce stasis of blood flow thrombosis formation [5].

A rare case of umbilical artery thrombosis is reported, which was diagnosed by ultrasound at 33 weeks of fetal gestation.

## Case Report

A 30-year-old, multiparous, gravida 3 woman at 33 weeks and 2 days of gestation was referred to our center with a presumptive diagnosis of umbilical artery thrombosis. She had a history of two previous early spontaneous miscarriages.

This pregnancy had been previously uneventful. There were no abnormalities found on the routine first and the second-trimester ultrasound (US) scans. The estimated fetal weight (EFW) was concordant with gestational age (70<sup>th</sup> centile). Three umbilical vessels were seen during the second US scan.

At 33 weeks and 2 days of gestation, during the routine third-trimester US scan, a single right umbilical artery was observed. On the left side of the umbilical cord, a hyperechoic segment was seen. Uterine and umbilical artery Doppler flow imaging did not show any abnormality of blood flow. There was no evidence of fetal intrauterine growth restriction (IUGR) and no reduction in amniotic fluid volume. Fetal heart rate monitoring, maternal blood pressure, and maternal blood tests were normal. Because of the suspicion of umbilical artery thrombosis, the patient was admitted to hospital to ensure close follow-up. Antenatal corticosteroid therapy for fetal lung maturation was administered. Fetal heart rate remained normal during monitoring three times a day.

A planned elective delivery by cesarean section was performed at 34 weeks and 3 days gestation and under spinal anesthesia. A healthy male infant was delivered with normal measurements, including a weight of 2,045 gm (25<sup>th</sup> centile), and with an Apgar score of 9 at the first and fifth minute. Arterial umbilical cord gases showed a pH of 7.31 and a lactate level of 2.0. Following delivery, macroscopic examination showed that the umbilical cord was normally inserted into a 'placenta bipartite,' but the umbilical cord was elongated, highly coiled and with a brownish color suggesting necrosis (Figure 1). The hypercoiled placenta contained ten coils for a 15 cm length

cord and contained thrombus within an umbilical artery at 7 cm from the cord insertion into the placenta.

Histology of the umbilical cord and placenta showed a recent umbilical artery occlusion with thrombus that contained fibrin. Three months following delivery, full maternal thrombophilia screening tests were normal.

## Discussion

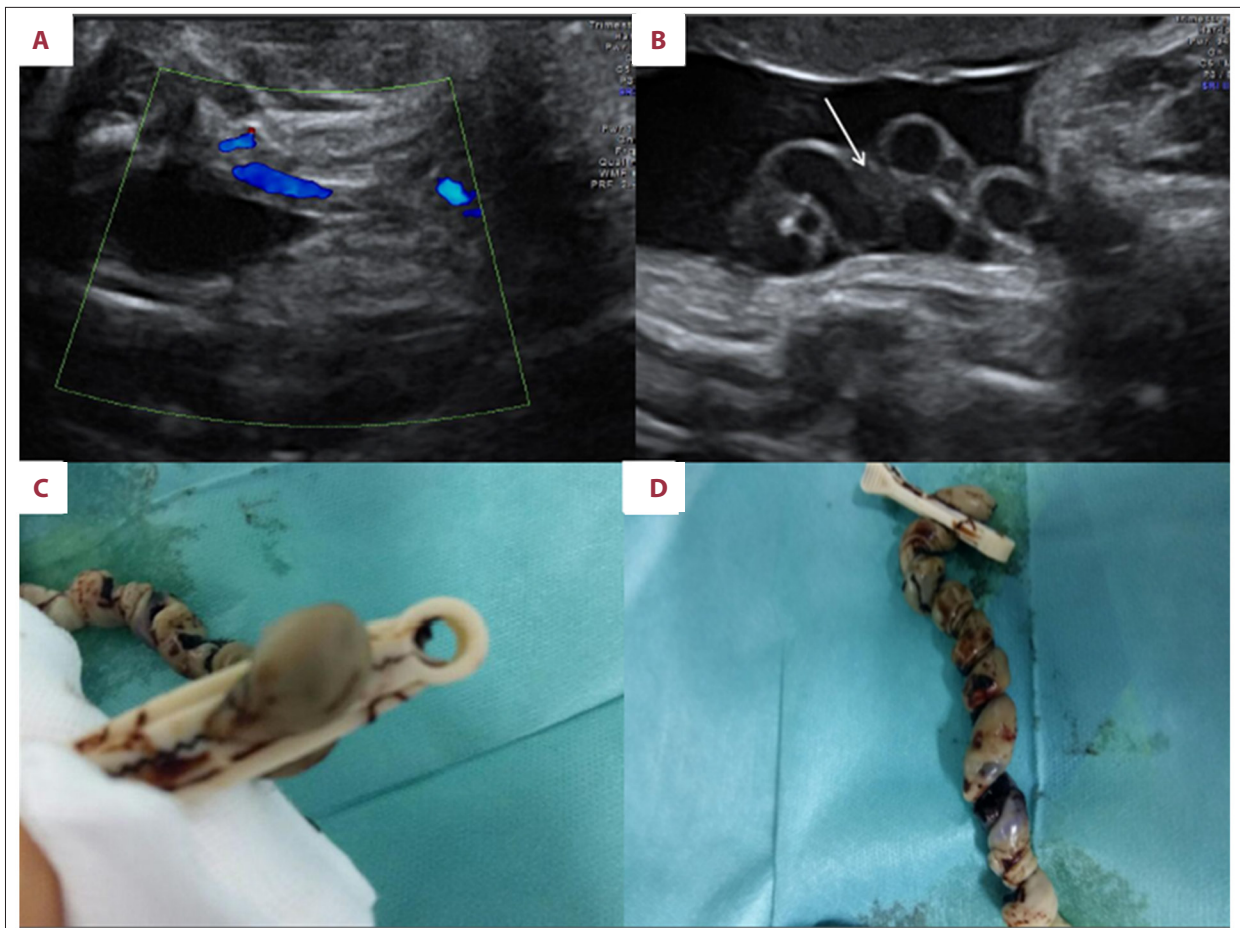
During pregnancy, umbilical artery and umbilical vein thrombosis have rarely been reported. The incidence of umbilical cord thrombosis has been reported to occur in approximately 1/1300 deliveries, 1/1000 post-natal autopsies, and 1/250 high-risk gestations, respectively [6]. Venous, venous and arterial, and arterial thrombosis have been reported to occur in 70%, 20%, and 10% of cases, respectively [4].

Umbilical artery thrombosis has a poorer prognosis than umbilical venous thrombosis and has been associated with increased rates of perinatal morbidity, including intrauterine growth restriction (IUGR), and increased fetal mortality. Since umbilical artery thrombosis is rare, no clear data exist regarding the management of patients with this condition.

The etiology of umbilical vessel thrombosis may be understood through Virchow's triad of reduced blood flow, hypercoagulability, and vascular abnormality. Hypercoagulability may be associated with inherited or acquired, maternal or fetal, thrombophilia. Endothelial damage may be due to materno-fetal infection (funisitis) or meconium-induced vascular necrosis. Blood stasis in vessels may be caused by mechanical or anatomical obstruction such as knots in the cord, hyper-coiling (antenatal umbilical cord index above 0.6), amniotic bands, velamentous cord insertion, and fetal vascular ectasia [1,3]. Maternal diabetes mellitus has been proposed as a risk factor for umbilical cord vascular thrombosis by some authors [1,7]. However, as in this case, there may be no clear underlying pathology.

Clinical findings of umbilical artery thrombosis have been reported to include single umbilical artery or a fetal thrombotic vasculopathy, where the thrombus migrates towards the placenta [1,5]. The latter condition may result in fetal growth restriction, fetal intolerance to labor (fetal distress), perinatal encephalopathy and neurologic impairment, neonatal liver disease, as well as an increased risk of stillbirth. Therefore, it is important to check for umbilical artery thrombosis in the work-up for causes of IUGR.

Because there is normally a single umbilical vein that carries oxygenated blood to the fetus, and two umbilical arteries that carry deoxygenated blood from the fetus, complete thrombosis



**Figure 1.** Umbilical artery thrombosis and elective cesarean section at 34 weeks and 4 days. (A) Single umbilical artery blood flow imaged using Doppler ultrasound at the level of the bladder. (B) Thrombosis of the umbilical artery (arrow). There is a hyperechoic area within the umbilical artery. (C) Three vessels are seen within a brownish umbilical cord following delivery. A single umbilical artery is not present. (D) A highly coiled umbilical cord, which could explain the thrombotic event.

of the umbilical vein can be lethal for the fetus [2]. However, small thrombi can migrate in the fetal circulation and cause cerebral or renal infarcts or end-organ lesions, such as amputation of the digits. In contrast to venous thrombosis, there is only partial necrosis of the vascular wall in umbilical artery thrombosis, as umbilical arteries lack vasa vasorum and their oxygen supply to the intima is provided by blood flow, and to the outer layer, this is provided by amniotic fluid [1,4].

Hyrtl's anastomosis, which is present in 90% of placentas, connects the two umbilical arteries and can explain some of the clinical outcomes of umbilical artery thrombosis, including the prevention of placental hypoxia and infarctions [1,7]. In this reported case, no Hyrtl's anastomosis was found on placental histologic examination.

In this case, umbilical artery thrombosis may have been caused by an elongated and hypercoiled umbilical cord. The favorable

course for the mother and child were due to early diagnosis, close maternal and fetal monitoring, and early delivery.

## Conclusions

In cases of umbilical artery thrombosis in pregnancy, time and mode of delivery should take into account fetal morbidity associated with prematurity, possible fetal intolerance to labor (fetal distress), and the risks of a sudden adverse event. Therefore, the management of umbilical artery thrombosis may include planned elective delivery by cesarean section following antenatal corticosteroid therapy for fetal lung maturation.

## Conflict of interest

None.

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