

## CASE REPORT

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# A Partial Supernumerary Umbilical Vessel

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**ABSTRACT** Supernumerary umbilical vessels are related to embryologic developmental defect of umbilical cord. These vessels can be seen varying numbers and types also partial or thoroughly. Extra vein is seen more common than extra artery, generally seen as four umbilical cord vessels (two veins, two arteries). This condition may accompany congenital malformations, poor obstetrics outcomes or well fetuses. Unlike the existing literature, a 22-year-old multiparous woman gave birth a healthy baby with spontaneous vaginal delivery at term. In the macroscopic examination of the umbilical cord was found to be 3 cm in a partial area, in microscopic examination multiple vessels (7 arteries, 5 veins) were found in this area. No information about umbilical cord vascular structure was found in prenatal ultrasonographies. Prenatal diagnosis of isolated supernumerary umbilical cord vessels tends to be overlooked; histopathologic examination is very important for detection of this abnormalities.

**Keywords:** Arteries; case report; supernumerary vessels; umbilical cord; veins

Supernumerary vessel means four or more arteries or veins originating from umbilical vessels.<sup>1</sup> This condition may accompany congenital anomalies or poor pregnancy results, and may also be seen in healthy fetuses.<sup>2</sup>

Its incidence rate is 1% and supernumerary vessels are seen as two arteries-two veins, and in some cases as an accessory vein in addition to the normal three-vessel structure.<sup>3</sup> The supernumerary vein typically has the structure of a vein and is often seen in the form of the right umbilical vein (PRUV) in the persist.<sup>4</sup> Extra umbilical artery is extremely rare.<sup>5</sup>

The supernumerary vessel structure reported in the literature typically has a four-vessel structure, namely two arteries-two veins or three arteries-one vein.<sup>2,6</sup> There are a few sporadic cases such as umbilical cord with six vessels (four veins-two arteries) in a conjoined twin pregnancy and umbilical cord with partial four vessels (two arteries-two veins) in a healthy newborn.<sup>7,8</sup>

In this study, unlike the existing literature, a case of umbilical cord with a normal vascular structure which consists of 12 vascular structures (7 arteries, 5 veins) in the partial area is presented.

## CASE REPORT

A 22-year-old (gravida 2, parity 1) multiparous female patient gave birth to a live and healthy female baby weighing 3090 gr whose 1<sup>st</sup> and 5<sup>th</sup> minute Apgar scores were 9 and 10 with spontaneous vaginal birth at her 39<sup>th</sup> gestational week. No information about umbilical cord vascular structure was found in prenatal ultrasonographies. Pregnancy follow-ups were normal and there was no systemic disease or smoking history.

In the histopathological examination of the placenta and the umbilical cord, the placenta was found to be weighing 745 gr with a size of 17×16×4 cm, compatible with gestational weeks 37-40. Perivillous fibrin accumulation and calcification areas were fol-

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lowed. The umbilical cord had a size of 39×1.7 cm with a structure of normal three vessels in the pericentral location. The diameter was found to be 3 cm in a partial area and multiple vessels consisting of 12 vessels (7 arteries, 5 veins) were found in microscopic examination (Figure 1, Figure 2, Figure 3). Newborn examination was normal and no findings compatible with fetal anomalies were identified. The postpartum 20<sup>th</sup> month follow-up was normal. Patient inform consent form has been received for this study.

## DISCUSSION

The umbilical arteries are first seen as the ventral branches of the dorsal aorta pair in the third week of embryogenesis. With the fusion of the dorsal aorta pair, the primitive umbilical artery merges with the descending aorta. It also develops around the arterial plexus allantois and becomes the allantoic artery which belongs to the body stalk; this artery is shorter than the right and left umbilical arteries, and typically



FIGURE 1: Macroscopic view of partially enlarged umbilical cord.



FIGURE 2: Macroscopic section of 12 vessels.

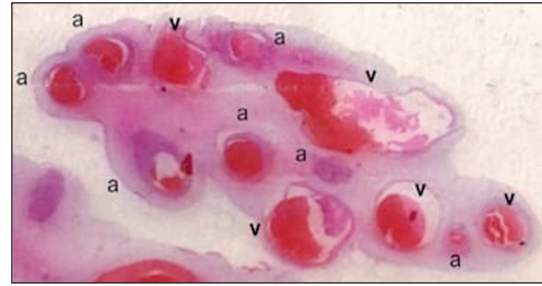


FIGURE 3: Microscopic view of 12 vessels.

the inter arterial anastomosis merges with the right or left umbilical artery on the side with the cord insertion.<sup>1</sup>

The development of the extra umbilical artery is seen in the course of the fusion of the umbilical artery with the descending aorta, in the phase of the single artery transformation during the formation of arterial plexus, during the fusion of the allantoic artery with the umbilical arteries, and during the division of the umbilical artery into two in embryonic development.<sup>1</sup>

Supernumerary umbilical artery is extremely rare. In a study of Kaçar et al. conducted on the supernumerary umbilical artery structure, they identified intrauterine development retardation and defined it as vitelline vascular remnant.<sup>2</sup> Stillbirth was reported in a case with three arteries, while no fetal anomalies or negative pregnancy outcomes were reported in other cases in the literature.<sup>5,9</sup>

In the fourth week of the intrauterine period, three pairs of major veins connect with the fetal heart. Umbilical vein develops from chorion, vitelline vein develops from yolk sac and cardinal vein is connected to the embryo and they all drain to sinus venosus of the fetal heart.<sup>10</sup> In the following weeks, anastomosis takes place between the left umbilical vein and the hepatic sinusoids, therefore the fetal hepatic portal system develops.<sup>4,10</sup> Some of the right umbilical vein and left umbilical vein are regressed. The right umbilical vein is typically obliterated between the days 28-32 and disappears in the 7<sup>th</sup> week.<sup>6</sup> If there is a problem at this stage, PRUV or rarely persistence in both umbilical veins are seen.<sup>4</sup>

Supernumerary umbilical vein-related cleft palate and lip, esophageal atresia, atrial septal defects,

hypertrophic cardiomyopathy, anterior chest wall defects, heterotaxy syndrome, hydrops, ectopia cordis, pulmonary stenosis, bifid liver, situs inversus, fallot tetralogy and gastrochisis cases have been reported.<sup>1,11</sup> There is a double ductus venosus case accompanied by PRUV in the literature.<sup>12</sup> In addition, negative pregnancy outcomes such as supernumerary umbilical vein-related preterm birth, stillbirth and intrauterine development retardation cases have been reported.<sup>4,5,8,12</sup> There are also normal fetuses with four-vessel vascular structures.<sup>4,8,12</sup>

Supernumerary umbilical vein is difficult to diagnose if there are no accompanying anomalies. It is seen at a rate of 0.2-0.4% with PRUV prenatal USG.<sup>6</sup> In a series of 16 cases, 56.2% were found to be postnatal.<sup>11</sup> Therefore, postpartum histopathological examination is important.

Excess vascular structure is noticed in the cross-sectional analysis of the cord. A few sections should be taken from a point far from the cord entry point, and should be distinguished from the false knot and cord vascular folds. In histopathological examination, the artery or vein structure is distinguished by its surrounding muscle layer.<sup>1</sup> There are two arteries and one vein in the umbilical cord. The artery is a muscular type vessel and appears round, while the vein has a dilated look with a thinner muscular layer.<sup>13</sup> Arteries do not have an internal elastic membrane and are known for having a thicker, concentrically distributed muscle layer than the vein. The vein holds a subintimal elastic membrane on a relatively thin muscle layer.<sup>13</sup>

Supernumerary umbilical vessels can be seen partial or thoroughly in the umbilical cord and generally, thoroughly multi vessel cords accompanies fetal abnormalities and poor obstetrics outcomes.<sup>4-7,9-12</sup> Partial supernumerary cords have been reported in

several cases and there are not any adverse perinatal outcomes in these cases.<sup>8,14</sup> In our study we didn't observe negative pregnancy outcomes.

## CONCLUSION

Even though umbilical cord structures with supernumerary arteries or veins are reported in the literature, there are no cases of umbilical cords with 12 vessels with arteries and veins together.

Supernumerary umbilical vessels are a rare cord anomaly, and may not be identified during prenatal ultrasonography. Macroscopic and histopathological examination of the placenta and umbilical cord after delivery is important to identify vascular anomalies due to their association with congenital anomalies and negative pregnancy outcomes as well as normal fetuses.

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### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

**Idea/Concept:** İrem Şenyuva, Şirin Küçük; **Design:** İrem Şenyuva; **Control/Supervision:** İrem Şenyuva, Şirin Küçük; **Data Collection and/or Processing:** İrem Şenyuva, Şirin Küçük; **Analysis and/or Interpretation:** İrem Şenyuva; **Literature Review:** İrem Şenyuva; **Writing the Article:** İrem Şenyuva; **Critical Review:** İrem Şenyuva.

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