

AYURVEDIC PERSPECTIVE OF CONGENITAL VASCULAR ANOMALIES: A REVIEW
OF SINGLE UMBILICAL ARTERY (SUA)Dr. Anjali Narwariya^{*1}, Assoc. Prof. (Dr.) Reetu Pandey², Dr. Pratiksha Godbole³¹PG Scholar, PG Department of *Prasuti Tantra Evum Stree Roga*, R.D. Memorial P.G. Ayurveda College, Bhopal, Madhya Pradesh, India.²Associate Professor PG Department of *Prasuti Tantra Evum Stree Roga*, R.D. Memorial P.G. Ayurveda College, Bhopal, Madhya Pradesh, India.³PG Scholar, PG Department of *Prasuti Tantra Evum Stree Roga*, R.D. Memorial P.G. Ayurveda College, Bhopal, Madhya Pradesh, India.***Corresponding Author: Dr. Anjali Narwariya**PG Scholar, PG Department of *Prasuti Tantra Evum Stree Roga*, R.D. Memorial P.G. Ayurveda College, Bhopal, Madhya Pradesh, India. DOI: <https://doi.org/10.5281/zenodo.21290951>**How to cite this Article:** Dr. Anjali Narwariya^{*1}, Assoc. Prof. (Dr.) Reetu Pandey², Dr. Pratiksha Godbole³. (2026). Ayurvedic Perspective of Congenital Vascular Anomalies: A Review of Single Umbilical Artery (Sua). *European Journal of Pharmaceutical and Medical Research*, 13(7), 436-442.

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ABSTRACT

Single Umbilical Artery (SUA) is one of the most common congenital umbilical cord abnormalities, characterized by the presence of a single artery instead of the normal two arteries. SUA may occur as an isolated finding or be associated with fetal growth restriction, congenital malformations, and adverse perinatal outcomes. While this condition is not directly described in *Ayurvedic* classics, its pathogenesis can be interpreted through *Ayurvedic* principles governing fetal development (*Garbhavakranti* and *Garbha Vikriti*). The condition was analyzed through the concepts of *Beeja*, *Beejabhaga*, *Beejabhagavayava Dushti*, maternal factors (*Matrija Bhava*), and disturbances of *Vata Dosha* during embryogenesis. From an *Ayurvedic* perspective, SUA may be considered a manifestation of *Garbha Vikriti* resulting from defects in *Beeja* or *Beejabhaga*, leading to abnormal organogenesis. Aggravated *Vata Dosha*, particularly during fetal development, may contribute to defective formation of fetal structures, including the umbilical vessels. Maternal dietary, lifestyle, and psychological factors causing *Dosha Vaishamya* can further influence fetal growth and development. The principles of *Garbhini Paricharya* and *Garbha Sanskara* emphasize preventive measures aimed at promoting healthy fetal development. Single Umbilical Artery can be conceptually understood in *Ayurveda* as a congenital developmental anomaly arising from disturbances in fetal formative factors and *Dosha* imbalance.

KEYWORDS: Congenital Anomalies, Single Umbilical Artery, Two vessels Umbilical Cord, *Garbhavakranti*, *Garbha Vikriti*, *Beeja*, *Beejabhaga*.**INTRODUCTION**

Single umbilical artery (SUA) is the most common congenital abnormality of the umbilical cord, characterized by the presence of one umbilical artery instead of the normal two arteries. It occurs in approximately 0.5–1% of singleton pregnancies and is more frequently observed in multiple gestations. SUA may occur as an isolated finding or in association with fetal structural abnormalities, chromosomal disorders, and adverse perinatal outcomes. Prenatal diagnosis is commonly achieved through routine ultrasonography, particularly during the second-trimester anomaly scan. The presence of SUA warrants a detailed fetal

anatomical assessment to identify associated anomalies involving the renal, followed by cardiovascular and genitourinary, gastrointestinal, and musculoskeletal systems. Isolated SUA generally carries a favorable prognosis; however, it has been linked to an increased risk of fetal growth restriction, preterm birth, low birth weight, and perinatal morbidity. Appropriate antenatal surveillance, including serial growth assessments, may be recommended to monitor fetal well-being. Postnatal evaluation is often considered to exclude occult congenital anomalies.

The umbilical cord forms a stable connection between

the fetus and the placenta at the fetomaternal interface. The cord develops between the third and seventh week following conception and usually comprises two umbilical arteries and one umbilical vein. However, the presence of only a single umbilical artery (SUA) is the most common umbilical cord abnormality and occurs in 0.2%–1.2% of live newborns.

The definitive diagnosis can be made histologically by the visualization of only two umbilical cord vessels. Prenatal diagnosis of SUA can be made using antenatal visualization of the umbilical cord using ultrasonography, especially with Colour Doppler flow imaging.

Although its pathogenesis is not clearly understood, three theories have been put forth to explain the occurrence of SUA. One theory attributes SUA occurrence to primary agenesis of one artery, a second theory proposes atrophy or secondary atresia of a formerly normal umbilical artery as the cause, and the third theory implicates a persistent allantois artery in the pathogenesis of SUA. From an embryological perspective, the second theory is the most plausible explanation.

An SUA is more frequently encountered in conjunction with a wide variety of other anomalies instead of as an isolated SUA. Although other malformations are present in 10%–27% of cases of SUA, documented findings lack consistency. The reported incidences of SUA with and without associated comorbidities in live births, either at term or pre-term, vary substantially among studies.

Therefore, this study aimed to evaluate the association between SUA and other congenital malformations with respect to *ayurvedic* correlations and to ascertain the existence of any preferential associations between SUA and specific anomalies.

दोषाभिधातैर्गभ्रियन्ते यो यो भागः प्रपीड्यते ।

स स भागः शिशोस्तस्य गर्भस्थस्य प्रपीड्यते ।। (सु.शा ३/१७)

According to *Acharya Sushrut*, the fetus receives nourishment through the mother's *rasa dhātu* (nutritive essence), the *nāḍīs* (channels), and the *aparā* (placenta). When the mother's *doṣas* become imbalanced, they may: Impair the supply of nutrients to the fetus, Affect the development of specific organs, Increase the risk of congenital abnormalities or developmental disturbances.

AIM AND OBJECTIVE

To understand the condition from the perspective of *Ayurvedic* concepts related to *Garbha Vikas* (fetal development) and *Garbhopaghata* (factors affecting fetal growth). To explore the *Ayurvedic* understanding of Single Umbilical Artery and correlate it with classical concepts of fetal development and

congenital anomalies.

CASE REPORT

The present case study represents single umbilical artery, age 26 years old female patient with chief complaint of 9 months amenorrhea visited the OPD of P.G. Department of *Prasuti Tantra Evum Stree Roga* on regular ANC checkup at R.D.M.C, Bhopal.

HISTORY:—A 26-year old female, multipara came for routine antenatal care (ANC) visit.

PERSONAL HISTORY

Name	XYZ
Age	26 year
Sex	Female
Marital status	Married
Occupation	House wife
Height	155cm
Weight	47kg
Sleep	Normal
Appetite	Normal
Bowel Habit	Regular

ON EXAMINATION

B.P.	110/70mmHg
P.R.	78/min
Temp.	97.8f

- Pitting edema present on both legs.

Per Abdomen

FH – Term Size FPP – Cephalic FHS – 130 bpm Ut – Relaxed.

Per Vaginal:- Cx- Soft, backward

One Finger loose, Station -3

Effacement – 10%, BOM- Present

Show -Absent, Pelvis seems to be adequate.

ASHTAVIDHA PARIKSHA

<i>Prakriti</i>	<i>Vatajpitaj</i>
<i>Mala</i> (Stool)	<i>Niram</i>
<i>Mutra</i> (Urine)	<i>Samyak</i>
<i>Jivha</i> (Tongue)	<i>Saam</i>
<i>Shabda</i> (Speech)	Clear
<i>Sparsh</i> (Touch)	Clear
<i>Druk</i> (Eyes)	<i>Prakrit</i>
<i>Aakriti</i> (Built)	<i>Madhyam</i>

DISCUSSION

A pregnant woman attended the Obstetrics Outpatient Department for a routine antenatal check-up. She had no significant medical or surgical history and her pregnancy had been uneventful till the current visit.

INVESTIGATION

Routine obstetric ultrasonography revealed:

- Single Umbilical Artery (two-vessel cord).

Sumit Uprety M.D. Reg. No. - M.P. -3452		DIAGNOSTIC CENTRE 38, Old MLA Quarters Jawahar Chowk, Bhopal Ph:0755-3565073	
◆ COLOR DOPPLER ◆ ULTRASONOGRAPHY ◆ X-RAY			
REPORT			
Patient's Name : [REDACTED]		Age/Sex: 25Y/F	
Ref by : Dr. Reetu Pandey MS		Date: 23/01/2026	

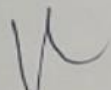
PAGE 2

- **Head:** Normal in size and shape. Fetal brain shows normal morphology. Occipital horn of lateral ventricle measures 5.7 mm. Falx, thalamus and septum pellucidum is normal. No obvious anomaly seen. Transcerebellar diameter measures 20.7mm. Cisterna magna is normal. It measures 4.0mm.
- **Face :** Both eye balls, lips, nasal bones, nasal bridge appears normal. Premaxillary triangle is normal. IOD= 10.9 mm OOD=33.6 mm= 21 weeks 04 days
- **Spine :** Full length of vertebral column has been visualized in axial, coronal and sagittal planes. Fetal spine is normal. No evidence of any spinal dysraphism.
- **Neck :** No obvious cystic neck mass seen.
- **Chest :** Normal cardiac solitus and position. Four chamber view and outflow tracts are normal. Both lungs are visualized. No mass lesions. No evidence of pleural or pericardial effusion.
- **Fetal abdomen** appears normal situs. Liver, gall bladder and spleen are normal. Normal stomach bubble seen. Normal insertion of cord seen. Abdominal wall is normal. No ascites seen.
- **Urinary Tract:** Both kidneys are normal in size. Bilateral (right > left) fetal pyelectasis and hydronephrosis is seen. Ureter are not dilated. AP diameter of right and left renal pelvis respectively measures 18mm and 6.5mm. Urinary bladder is normal. No dilatation of bladder neck.
- Both humerus, radius, ulna, hands, femur, tibia, fibula and foot are normal.
- Two vessel cord with single umbilical artery and vein is seen. Mean PI of uterine artery = 1

IMPRESSION:- Single intrauterine live fetus in variable presentation of 20 weeks 06 days +/- 02 weeks of gestational age. Bilateral (right > left) fetal pyelectasis and hydronephrosis. Follow up USG is recommended.

Declaration

I Dr Sumit Uprety had conducted antenatal USG of Mrs. Vinita. I had neither declared nor disclosed the sex of fetus to anyone in any manner.


 Dr. Sumit Uprety MD

Sumit Uprety
M.D.
Reg. No. - M.P. -3452

DIAGNOSTIC CENTRE
38, Old MLA Quarters
Jawahar Chowk, Bhopal
Ph:0755-3565073

◆ COLOR DOPPLER ◆ ULTRASONOGRAPHY ◆ X-RAY
REPORT

Patient's Name : [REDACTED] Age/Sex : 26 Y/F
Ref by : Dr. Reetu Pandey MS Date : 22/05/2026

OBSTETRIC COLOR DOPPLER

Single intrauterine live fetus seen in vertex presentation. Single loose loop of umbilical cord is seen around the neck.

Fetal heart:- Heart rate = 126 Beats/mnt.

Placenta is Posterior in upper and mid segment away from i. os. Maturity Grade III. No evidence of placenta accreta.

Amniotic fluid: Oligohydramnios is seen. AFI= 2.6 cm. Single deepest cord free pocket seen measuring 2.6 cm.

Internal os is closed. Cervical length is 44 mm.

Fetal right kidney shows moderate hydronephrosis with dilated renal pelvis. AP diameter of right renal pelvis measures 12.1 mm. Left renal pelvis is normal measuring 2 mm in its AP diameter. Ureter is not dilated. Fetal head, both dome of diaphragm, and urinary bladder are normal. Normal 4 chamber heart is seen. Normal LVOT/RVOT and 3VTV seen.

Fetal breathing movement, body movement, tone, reactive FHR are normal. Fetal biophysical profile scores 8/10. Fetal ECHO is not included in this study.

FETAL BIOMETRY	PERCENTILE
- BPD- 92.3 mm 37weeks 04 days	63
- HC- 328.3 mm 37 weeks 03 days	18
- AC- 336.5 mm 37weeks 04 days.	59
- FL= 73.8 mm 37 weeks 06 days.	49
- Gestational age = 37 weeks 05 days +/- 03 weeks.	
- EDD -06/06/2026 EFW= 3247 Gm +/- 474 Gm	54

CONTD.....

- In target scan we find **URINARY TRACT**: Both kidneys are normal in size. Bilateral (right>left) fetal pyelectasis and hydronephrosis is seen. Ureter are not dilated. AP diameter of right and left renal pelvis respectively measures 18mm and 6.5mm. **Two vessels cord with single umbilical artery and vein is seen.**

DELIVERY NOTES

She delivered a male baby on(25/5/2026) at 4:48pm with weight 2.585 kg, baby cried immediately after birth. Baby born with an isolated single umbilical artery (SUA). Baby was delivered by normal spontaneous

vaginal delivery at 39 weeks 01 day of gestation. Cord was clamped and cut under aseptic precautions.

On examination,

- The baby was normal, and there were no dysmorphic features or no obvious congenital anomalies. **Two vessels cord with single umbilical artery and vein is seen.**
- After delivery baby was in under examination, a newborn baby does not pass urine on the first day after delivery.

Investigation of newborn



Dr. Sumit Uprety
M.D.
Reg. No. - M.P. - 3452

Sumit
DIAGNOSTIC CENTRE
38, Old MLA Quarters
Jawahar Chowk, Bhopal
Ph: 0755-3565073

COLOR DOPPLER + ULTRASONOGRAPHY + X-RAY

REPORT

Patient's Name : Dr. [REDACTED] Age/Sex : 3D/M
Ref by : Dr. Renu Pandey MS Date : 26/05/2026

USG ABDOMEN

Liver: Liver is normal in size. Normal in shape and have smooth contour. Hepatic parenchyma is homogenous in echotexture. Intra and extra hepatic biliary and vascular channels are normal. No gross or diffuse mass lesions seen.

Gall Bladder: Gall bladder seen as an anechoic thin walled cavity with normal size and shape. No cholelithiasis or mass lesions seen. CBD is normal in caliber.

Pancreas: is normal in size and echotexture. No focal lesion seen. Main pancreatic duct is not dilated. No evidence of pancreatic pseudocyst or peripancreatic fluid collection.

Spleen: is normal in size, shape and echotexture.

Kidneys: Both the kidney is normal in size, shape, axis and position. Cortical echotexture and Cortico medullary differentiations are normal. No calyceal dilatation or calculus seen on either side. Minimal splitting of right pelvicalyceal system is seen. AP diameter of right renal pelvis measures 3.4mm.

Urinary bladder: Urinary bladder is normal in size, shape and contents. Wall is normal. No calculus or mass lesion.
- No free fluid or ascites seen.

IVC, & Abdominal Aorta: are normal.
- No obvious lymphadenopathy.
- No evidence of pyloric stenosis or mid gut volvulus or intestinal obstruction.
- No evidence of intussusception.
- No evidence of acute appendicitis.

IMPRESSION: - Normal abdominal USG findings.

NOTE: - All measurement of organs are documented in film, provided.
This investigation has been done as per the advice of referring doctor. Investigators have their limitations. Solitary radiological investigation never confirms the final diagnosis of a disease, but is meant to assist referring doctor to have an idea of disease process, if any. So this report shouldn't be taken as final diagnosis, but it should be correlated clinically and/or other investigations.

Dr. Sumit Uprety, MD
Consultant Radiologist
Reg. No MP 3452

The ultrasound of abdomen done on day 2 of life showed both the kidneys are normal in size, shape axes and position. Cortical echo texture and cortico medullary differentiations are normal. No calyceal dilation or calculus seen in either side. Minimal splitting of right pelvic calyceal system is seen. AP diameter of right renal pelvis measures 3.4mm. The baby is now 7 days old and was brought for review. He is feeding well and gaining weight.

बीजात्मककर्माशयकालदोषैर्मातुस्तथाऽऽहार विहारदोषैः ।

कुर्वन्ति दोषा विविधनिदृष्टाः संस्थानवर्णानिन्द्रियवैकृतानि

According to Acharya Charak, *beeja dosha* corresponds to genetic and chromosomal abnormalities, including gene mutations and inherited disorders. *Ashaya dosha* can be correlated with abnormalities of the uterus, placental insufficiency, intrauterine infections, and other adverse conditions within the intrauterine environment. *Kala dosha* reflects the importance of critical periods of embryonic development, particularly organogenesis during the first trimester, when the fetus is most vulnerable to harmful influences. Maternal dietary and lifestyle factors are now recognized as major determinants of fetal health; nutritional deficiencies, especially inadequate folic acid intake, maternal illnesses such as diabetes, exposure to alcohol, tobacco, certain medications, environmental toxins, and radiation can all increase the risk of congenital anomalies. The concept of *atma-karma dosha* does not have a direct biomedical equivalent but may be viewed as representing currently unexplained, idiopathic, or complex epigenetic influences.

From a modern medical perspective, *beeja dosha* corresponds to genetic and chromosomal abnormalities, including gene mutations and inherited disorders. *Ashaya dosha* can be correlated with abnormalities of the uterus, placental insufficiency, intrauterine infections, and other adverse conditions within the intrauterine environment. *Kala dosha* reflects the importance of critical periods of embryonic development, particularly organogenesis during the first trimester, when the fetus is most vulnerable to harmful influences. Maternal dietary and lifestyle factors are now recognized as major determinants of fetal health; nutritional deficiencies, especially inadequate folic acid intake, maternal illnesses such as diabetes, exposure to alcohol, tobacco, certain medications, environmental toxins, and radiation can all increase the risk of congenital anomalies.

CONCLUSION

Single umbilical artery (SUA) is a significant congenital vascular anomaly that may reflect disturbances occurring during early embryogenesis. From an *Ayurvedic* perspective, the present study suggests a possible correlation between *Matrja Ahara Vikrti* (maternal dietary derangements) and *Bijaduṣṭi* as contributory factors in the development of fetal structural abnormalities. Inadequate or improper maternal nutrition during pregnancy may adversely influence fetal growth and development through impairment of *Rasa* and *Rakta Dhatu* nourishment, ultimately affecting organogenesis.

Furthermore, the concept of *Mahanumadika Bijaduṣṭi* may provide a theoretical framework for understanding congenital anomalies such as SUA, wherein defects in the parental reproductive elements (*bija*) result in aberrant fetal development. The observed association highlights the importance of preconceptional care,

appropriate maternal nutrition, and maintenance of optimal reproductive health as emphasized in *Ayurveda*.

Although these correlations offer valuable insights into the *Ayurvedic* understanding of congenital anomalies, the findings should be interpreted cautiously, as they remain conceptual and exploratory. Further interdisciplinary research integrating *Ayurvedic* principles with contemporary embryological and genetic evidence is warranted to establish clearer causal relationships and strengthen the scientific basis of these observations. According to this concept, the vitiation of the *Tridoṣas* (*Vata*, *Pitta*, and *Kapha*) due to multiple prenatal influences may result in abnormalities affecting the fetus. The term *Bija doṣa* refers to defects in the parental reproductive elements (*Sukra* and *Artava*), which can be correlated with genetic and hereditary factors. *Karma-ashaya doṣa* denotes the influence of past actions or unexplained factors contributing to fetal abnormalities. *Kala doṣa* signifies the impact of inappropriate timing, seasonal variations, or adverse environmental conditions during conception and gestation.

Furthermore, *Matuḥ ahara-vihara doṣa* emphasizes the role of improper maternal diet, lifestyle, psychological stress, and unhealthy behaviors during pregnancy. The verse states that these factors, individually or collectively, lead to the vitiation of the *doṣas*, ultimately causing *saṁsthana-vaikṛti* (structural abnormalities), *varṇa-vaikṛti* (alterations in complexion or appearance), and *indriya-vaikṛti* (defects in sensory organs and functions) in the developing fetus. This *Ayurvedic* concept demonstrates a holistic understanding of congenital anomalies by integrating hereditary, maternal, environmental, temporal, and lifestyle-related determinants.

These principles exhibit conceptual parallels with modern teratology, which recognizes genetic predisposition, maternal health and nutrition, environmental exposures, and prenatal influences as significant contributors to abnormal fetal development.

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