A study of single umbilical artery and its associated findings at tertiary health care centre

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Abstract
Background: Nearly 1 in 100 liveborn fetuses are diagnosed with single umbilical artery (SUA) **Aims and Objectives:** To Study Single Umbilical artery and its associated findings at tertiary health care centre. **Methodology:** After approval from institutional ethical committee a cross-sectional study was carried out in the department of Radiology of a tertiary health care centre during the two year period i.e. May 2016 to April 2018. This was a record based study all the sonography report were assesed to find out Single Umbilical artery and its associated findings or anomaly if present or not. Here all the anomaly scans were performed by Expert radiologists and by Color Doppler machines. All the reports were entered in the excel sheets and Analyzed by SPSS 19 version software for windows. **Result:** Out of 9870 all anomaly scan done in two years duration 80 were diagnosed as with Single Umbilical artery (SUA) so the prevalence of SUA in our study was 0.81% or 8.1 per one thousand anomaly scans done. The majority of the scans were with no associated anomaly or abnormal findings i.e. 67.5% followed by IUGR were 40%, Uro-genital anomalies were 16.25%, Cardiovascular anomalies were 15%, CNS anomalies were 11.25%, Skeletal were 8.75%, and GIT anomalies were 6.25%. The association of IUGR was 67.5 and 0.73%, Uro-genital anomalies -16.25 and 0.32, Cardiovascular anomalies -15% and 0.29%, CNS anomalies -11.25% and 0.20%, Skeletal- 8.75% and 0.17%, GIT anomalies -6.25% and 0.13% overall the presence of abnormal findings were significantly higher in SUA group as compared to Non SUA group (χ^2 =1701, df=6, p<0.0001). **Conclusion:** It can be concluded from our study that the prevalence of SUA was 0.81%The majority of the scans were with no any associated anomaly i.e. 67.5% followed by IUGR were 40%, overall the presence of anomalies were significantly higher in SUA group as compared to Non SUA group
Key Words: SUA (Single Umbilical Artery), Foetal Anomaly Scan, IUGR (Intrauterine Growth Restriction), Urogenital anomalies, Cardio vascular anomalies, Gastro Intestinal Tract(GIT), CNS (Central Nervous System).

INTRODUCTION

Nearly 1 in 100 liveborn fetuses are diagnosed with single umbilical artery (SUA) and yet no consensus exists regarding the clinical relevance of this finding.[1-3] Clinicians have long suspected an association between SUA and findings of intrauterine growth restriction (IUGR), preterm delivery, stillbirth, and congenital anomalies. Several studies have detected associations between SUA and adverse fetal outcomes to varying degrees. Some show not only an increased incidence of prematurity and IUGR in SUA babies but also a higher incidence of renal anomalies.[4,5]So we have done this study with the aim to see the prevalence of various anomalies and abnormal findings in comparison to non SUA group.

MATERIAL AND METHODS

After approval from institutional ethical committee a cross-sectional study was carried out in the department of Radiology of a tertiary health care centre during the two year period i.e. May 2016 to April 2018. This was a record based study all the sonography report were assessed to find out Single Umbilical artery and its associated anomaly if present or not. Here all the anomaly

scans were performed by expert radiologists and by color Doppler machine. All the reports were entered in the excel sheets and Analyzed by SPSS 19 version software for windows.

RESULT

Out of 9870 all anomaly scan done in two years duration 80 were diagnosed as with Single Umbilical artery (SUA) so the prevalence of SUA in our study was 0.81% or 8.1 per one thousand anomaly scans done.

Table 1: Distribution of the SUA foetus with respect to radiological diagnosis

Radiological Findings	No. (n=80) *	Percentage (%)
No any anomaly	54	67.5
IUGR	32	40
Uro-genital	13	16.25
Cardiovascular	12	15
CNS	9	11.25
Skeletal	7	8.75
GIT	5	6.25

*(More than one radiological features/ anomalies were present so total may be more than 80)

The majority of the scans were with no any associated anomaly i.e. 67.5% followed by IUGR were 40%, Uro-genital were 16.25%, Cardiovascular were 15%, CNS were 11.25%, Skeletal were 8.75%, GIT were 6.25%.

Table 2: Distribution of the SUA and Non SUA Scans with respect to Anomaly

Radiological Findings	SUA (n=80)	Non-SUA (n=9790)
No any anomaly	54 (67.5)	9798 (99.27)
IUGR	32(40)	72 (0.73)
Uro-genital	13 (16.25)	32 (0.32)
Cardiovascular	12 (15)	29 (0.29)
CNS	9 (11.25)	20(0.20)
Skeletal	7 (8.75)	17(0.17)
GIT	5 (6.25)	13 (0.13)

(χ^2 =1701, df=6, p<0.0001)

The findings or anomalies like IUGR was 67.5 and 0.73%, Uro-genital -16.25 and 0.32, Cardiovascular -15% and 0.29%, CNS -11.25% and 0.20%, Skeletal- 8.75% and 0.17%, GIT-6.25% and 0.13% overall the presence of abnormal findings were significantly higher in SUA group as compared to Non SUA group (χ^2 =1701, df=6, p<0.0001)

DISCUSSION

The absence of one umbilical artery, defined as a single umbilical artery (SUA), is found in 0.2-1.9% of deliveries.[5,6,7,] A number of studies have reported that the presence of SUA may be related to a variety of congenital anomalies of the major organ systems as well as to chromosomal defects, aneuploidy, preterm delivery, and low birth weight. Incidence estimates from various populations (which may suffer from selection biases) range from 0.2-0.87%, with an associated anomaly rate reported to be as high as 67%.[8-10] With the advent of color Doppler USG, umbilical arteries can be imaged in the amniotic cavity and in the fetal pelvis as they course around the bladder. Detection of SUA by USG is a potentially useful marker for suspecting an anomalous fetus. The three theories about the pathogenesis of SUA are (1) primary agenesis of one of the umbilical arteries, (2) secondary atrophy of a previously normal artery, and (3) persistence of the original single allantoid artery of the body stalk.[11] A number of genetic [12] as well as environmental[13-14] actors have been mentioned as possible causes of SUA. According to some authors[15] SUA is etiologically heterogeneous, and more than one of the suggested mechanisms could be responsible. In our study we have seen that Out of 9870 all anomaly scan done in two years duration 80 were diagnosed as with Single Umbilical artery (SUA) so the prevalence of SUA in our study was 0.81% or 8.1 per one thousand anomaly scans done. The majority of the scans were with no any associated anomaly i.e. 67.5% followed by IUGR were 40%, Uro-genital were 16.25%, Cardiovascular were 15%, CNS were 11.25%, Skeletal were 8.75%, GIT were 6.25%. The anomalies like IUGR was 67.5 and 0.73%, Uro-genital -16.25 and 0.32, Cardiovascular -15% and 0.29%, CNS -11.25% and 0.20%, Skeletal- 8.75% and 0.17%, GIT-6.25% and 0.13% overall the presence of anomalies were significantly higher in SUA group as compared to Non SUA group (χ^2 =1701, df=6, p<0.0001). These findings are similar to Meiling Hua [16] they found Of 72,373 pregnancies, 64,047 (88.5%) had pregnancy follow-up information and were available for this analysis. There were 392 cases of single umbilical artery (0.61%) diagnosed at anatomic survey; slightly lower than previously reported. Single umbilical artery as compared with double umbilical artery was associated with increased risk of renal anomalies (adjusted odds ratio [OR] 3.0, 95% confidence interval [CI] 1.9 – 4.9, P<0.01 and cardiac anomalies (adjusted OR 20.3, 95% CI 13.5–30.4, P<0.01, suggest an increased risk of IUGR when the diagnosis of single umbilical artery is made, making a clinical recommendation for serial growth assessments in the setting of single umbilical artery reasonable.

CONCLUSION

It can be concluded from our study that the prevalence of SUA was 0.81% The majority of the scans were with no any associated anomaly i.e. 67.5% followed by IUGR were 40%, overall the presence of anomalies were significantly higher in SUA group as compared to Non SUA group.

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