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Histopathological findings of umbilical cord in intrauterine growth restriction

Sudhakara Babu Chelli
Ph.D. Scholar, Bharath Institute of Higher Education and Research, Chennai, Tamil Nadu

Surekha S M
Associate Professor, Department of Obstetrics and Gynecology, KIMS, Koppal, Karnataka

Upendhar Reddy P
Assistant Professor, Department of Anatomy, SVS Medical College, Mahbubnagar, Telangana

Sthevaan
Prof. & HOD, Department of Anatomy, Sree Balaji dental college & hospital, Chennai, Tamil Nadu

Govindarajan Sumathy*
Govindarajan Sumanthy, Prof. & HOD, Department of Anatomy, Sree Balaji dental college & hospital, Chennai, Tamil Nadu
*Corresponding author

***Abstract*---**Background: Intrauterine growth restriction is one of the causes of perinatal mortality and morbidity. Intrauterine growth of fetus depends on maternal, fetal and genetic factors. Aim of the study was to find the histopathology of umbilical cord in IUGR and normal pregnancies. Materials & methods: This prospective case control study included 100 umbilical cord samples which were equally distributed as cases and control. Routine histological procedures were followed for staining of tissue. Histopathology readings were photographed and noted. Results: In our study we found 24 % Wharton's jelly oedema and 28 % venous dilatations in IUGR. We didn't observe any thrombus, fibrinoid necrosis, perivascular or intraparietal hemorrhage, arterial or venous thrombus in our study both in cases and control. Conclusion: Umbilical cord and placental histopathology provides insight to predict reoccurrence of IUGR and for timely management.

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Keywords---intrauterine growth restriction, histopathology, Wharton's jelly oedema, venous dilatation.

Introduction

Intrauterine growth restriction (IUGR) increases perinatal mortality by way of 10–25% and morbidity by 50–75% and predisposes the newborn to metabolic syndrome, diabetes mellitus, stroke, and coronary heart disease[1].Essential factor for adequate exchange of metabolites, nutrients and gases between mother and fetus is microvasculature of placenta[2]. Decreased volume of placenta, reduced placental surface area, reduced placental size are associated with an increased risk of developing IUGR[3,4]. Limited blood flow to fetus due to placental insufficiency is the main underlying cause of IUGR[5,6]. Fetal failure to attain sufficient growth due to fetal, maternal or placental pathology[7].

Materials and Methods

This prospective case control study was carried out in Department of Anatomy, KIMS, Koppal after getting institutional ethical committee approval. umbilical cord samples were divided into 50 cases and 50 controls after applying inclusion and exclusion criteria. After delivery, umbilical cord was cut 5 cm away from its placental attachment. Samples were fixed in 10% formalin and processed for H & E staining. Leica DM 1000 LED microscope was used for histopathology examination.

Results

In our study, we found no thrombus, fibrinoid necrosis, perivascular or intraparietal hemorrhage, arterial or venous thrombus, Wharton's jelly oedema and venous dilatation in normal cord. In IUGR cords 24% of Wharton's jelly oedema was observed and venous dilatations were 28 % (Table-1 & Figure 1). Thrombus, fibrinoid necrosis, perivascular or intraparietal hemorrhage, arterial or venous thrombus was not observed in IUGR umbilical cord in our study.

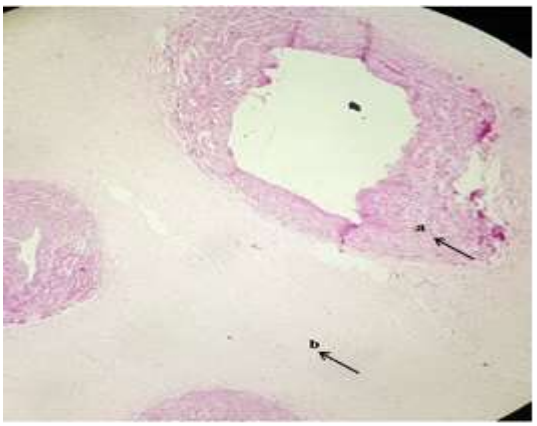

Fig.1 IUGR umbilical cord showing venous dilatation (a) and Wharton's jelly oedema (b)

Table -1: Histopathology parameters of IUGR umbilical cord

S. NO.	Microscopic findings	IUGR umbilical cord (%)
1	Thrombus	NIL
2	Fibrinoid necrosis	NIL
3	Perivascular hemorrhage	NIL
4	Intra parietal hemorrhage	NIL
5	Arterial thrombus	NIL
6	Venous thrombus	NIL
7	Wharton's jelly edema	24
8	Venous dilatation	28

Discussion

Umbilical cord is well protected by specialized connective tissue, Wharton's jelly which is characterized by extracellular matrix and cellular matrix [8,9]. Absence of Wharton's jelly was rare and was reported by Oliveira CC et al [10]. Umbilical cord oedema had no significant role for infants but their heavier placenta showed no evidence of generalized oedema [11]. Byers et al observed 52 cases of fetal intra-abdominal umbilical vein varix that were associated with other obstetric complications. Focal dilatation of intra-abdominal portion of umbilical vein is called Fetal intra-abdominal umbilical vein varix (FIUV) [12]. According to Mahony et al FIUV varix is associated with high rate of fetal abnormalities [13]. Intrinsic weakness or unsupported intra-abdominal segment of umbilical vein makes it susceptible to stress changes which results in venous segmental dilatations [14]. Krupa Hitesh Shah et al reported a case of isolated umbilical vein varix with distal epispadias that is associated with fetal intra-abdominal umbilical vein varix[15]. FIUV varix is associated with 10.7 % intrauterine growth restriction according to Mankuta D et al[16] and 4 % according to Bas-Lando M et al [17] and 1.9% according to Byers et al[12] . Umbilical artery occlusion with fibrin containing thrombus was reported by Lutfallah F et al[18]. Klaritsch P et al observed a cord with umbilical artery thrombus occupying entire length which led to severe intra uterine growth restriction[19]. In our study we didn't observe any arterial or venous thrombus. Umbilical cord thrombosis is a rare and was reported in 52 cases by Heifetz SA where male predominance was slight[20]. In present study we didn't observe any thrombus of cord. Blanco MV et al reported 2 venous dilatation, 4 arterial /venous thrombus [21]. In our study we found 28 % venous dilatations which was more than the findings of other authors.

Conclusion

Microscopic examination of umbilical cord and placenta reveals the underlying pathology which helps to find out other indicators of fetal growth restriction. Literature in this area is scanty hence more number are studies should be done for understanding the histopathology of umbilical cord and placenta.

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