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Comparative Study of Thickness of Tunica Media of Umbilical Cord Vessels in Normal and PIH Patients

Medical Science

KEYWORDS : Umbilical cord, PIH, Vessels, Tunica Media

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ABSTRACT

Aim and Objectives: To compare the thickness of tunica media of umbilical cord vessels in normal and PIH patients on histological basis.

1. To calculate thickness of tunica media of umbilical cord vessels in normal patients.
2. To calculate thickness of tunica media of umbilical cord vessels in PIH patients.
3.. Compare between thickness of tunica media in normal and PIH patients.
Materials : The study sampled 30 normal placenta with umbilical cord and 30 placenta with umbilical cord from PIH patients are included in the study.
Methods : After delivery, the umbilical cord with placenta were collected from labour room of MGM Hospital, Kalamboli, Navi Mumbai and fixed in 10% formalin solution.
For Histology – Standard procedure was used and H & E stain was used. The thickness of tunica media was measured with micrometer eyepiece.

Introduction

- Umbilical cord is the life line of the fetus.
- Umbilical cord is formed during 4th to 8th week of development from the connecting stalk.
- Blood flow is established by the end of 5th week of gestation.
- The umbilical cord is helical structure which connects the fetus to the placenta and supplies nutrients to the fetus.
- It contains 2 arteries and 1vein embedded in Wharton's jelly which gives flexibility, mobility and strength to resist compression at the same time allows fetus to move freely.
- PIH is one of the most common pregnancy associated condition which is characterized by generalized edema, hypertension &
- protein urea presenting after 20th wks of gestation.
- PIH as one of the important causes for low birth weight, pre mature birth & intra uterine growth retardation.
- In India PIH is one of the major causes of maternal death and poor perinatal outcome .The etiology of these disorder is still unknown.
- Various studies have been done and it is documented that PIH occurs in 6 to 20 % of all pregnancy.
- So, our aim of this study is to compare the thickness of tunica media of umbilical cord vessels in normal & PIH patients on histological bases.

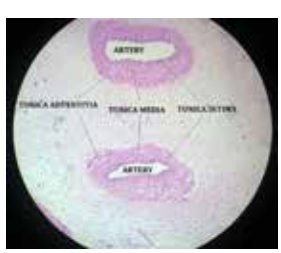
Materials and methods

Fig: 1 Micrometers Eyepiece.

- After ethical review 60 delivered placenta with umbilical cord obtained from labour room of MGM Hospital, Kalamboli, Navi Mumbai & fixed in 10% formalin solution.
- The study was carried upon 60 umbilical cords samples. 30 Normal & 30 PIH umbilical cord with the written consent of the patients.
- Tissue section of umbilical cord was taken from the maternal end fetal end.
- Blocks were made from umbilical cord tissue by using standard protocol.
- Slides were prepared and stained with H & E
- Thickness of tunica media was measured with micrometer eyepiece.

Observation and Results

1. All Umbilical cord showed Two Arteries and Single Umbilical Vein.
2. Vein has larger diameter as compare to arteries.
3. Vein has thin coat of muscle fibers.
4. Thickness of arteries was significantly increase in PIH.
5. Thickness of Tunica media significantly increase in PIH.



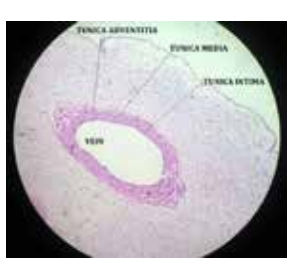


Fig2: Photograph of Normal Umbilical Cord taken on 10 x

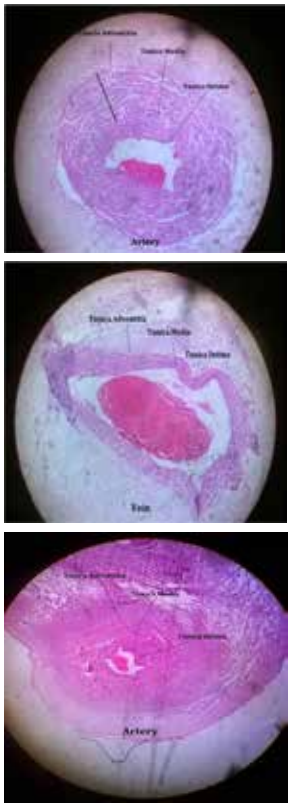
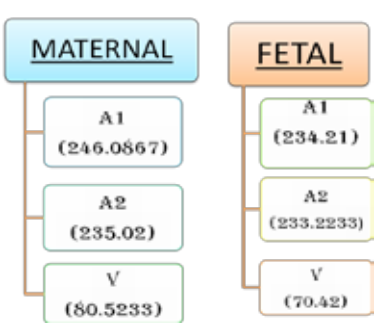


Fig 3: Photograph of PIH Umbilical Cord on 10 x

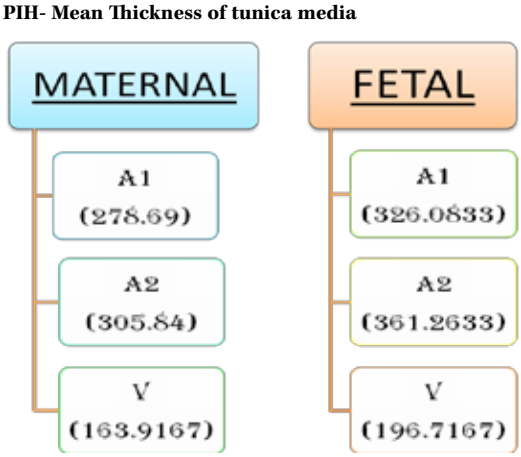
Tunica media of umbilical cord vessels, we observed the significant increased in the muscle thickness layers in the PIH.

Comparison of Tunica Media Thickness in Normal and PIH

NORMAL-Mean Thickness of Tunica Media



PIH- Mean Thickness of tunica media



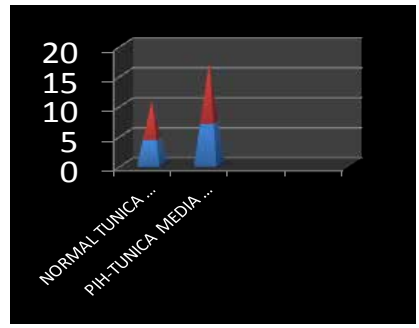


Fig 4: Showing increase in Tunica Media Thickness In PIH ascompare to Normal

DISCUSSION

- The umbilical cord appears to play important role in interactions between the mother & fetus during pregnancy
- It has been demonstrated that the important causes of intrauterine growth retardation, premature birth, low birth weight, pre-natal morbidity, the placental & vascular resistance are associated with PIH
- The reduction in the vascular layer is mostly accompanied by significant structural disorder which have an impact upon the tunica intima & media.
- We observed a significant increase in the muscle thickness layers in the pregnancy induced hypertension as compared to normal.
- Similar to our study Barwal et.al in their study reported a significant increase in the wall thickness of umbilical cord vessel.
- Junelk et al. demonstrated that umbilical Arteries were thicker in the PIH then in normal.
- As the pressure rises, the blood vessel distended and vascular smooth muscle fibers surrounding the vessels contract.
- This is probably due in part, to intrinsic contractile response of smooth muscle to stretch. As further rise in pressure of vessel stimulate the increase in contractile unit that is smooth muscle fibers. Maintenance of a given wall tension as the pressure rises would regain a decrease in luminal radius and increase in wall thickness of umbilical arteries.
- Umbilical vein has lesser amount of smooth muscle fibers as compare to umbilical arteries. Umbilical arteries are more compliant than umbilical vein. Pressure rises in the lumen of umbilical arteries stretches the arterial wall and it tries to compensate for pressure by increase in the wall thickness or increase in the effective contractile units. But the umbilical vein compensates or increases the effective contractile units only upto certain limit of rise in pressure and with further rise in luminal pressure, it is unable to compensate and becomes dilated and thin wall.

Conclusion

- We Observed significant increase in thickness of tunica media in PIH cases.

References

1. Sabnis A. S, More R. M, Mali S and Niyogi G."Umbilical cord morphology and its clinical significance". ISSN : 0976 – 8726 & E – ISSN : 0976 -8734 Volume 3, Issue 1, 2012.
2. Karma Lakhi Bhutia, Dr. Ratna Balesen gupta, Dr. B. K . Kanungo, Dr. Benoy Upreti, Jerina Tiwari, and Dr. Binod K. Tamang. Image J Analysis of Tunica Media of Hyrtls anastomosis in pregnancy Induced Hypertension J (AMR) Vol 1 No. 2, Oct 2014.
3. Koech A, Nadungu B, Gichangi P. Structural changes in umbilical vessels in pregnancy induced hypertension. Placenta. 2008 Feb; 29 (2) : 210-4. Epub 2007 Dec 3.
4. Zuspan F B "New Concepts in the understanding of hypertensive diseases dur-

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ing pregnancy". An overview clinical prenatal 1991, 18: 653-659.

5. Manual Vazquez Blanco, Hilda Ruda Vega, Roberto A. Guerrie – Gutten Berg, Rodolfo Giuliano, Daniel R. Grana, Frencisco Azzato, Jose Milei. Histopathology and Histomorphometry of Umbilical Cord Blood Vessels. Findings in normal and high risk pregnancies. Artery research (2011) XX. 1-8.
6. 6. Nag U, Chakrawarthy VK, Rao Dr. Morphological changes in placenta of hypertensive pregnant women. I J RRMS/ Volume 3/No. 2/APR-June 2013.
7. Barnwal M, Rathi SK, Chhabra S, Nanda S. Histomorphometry of Umbilical Cord and its Vessels in Pre-Eclampsia as Compared to Normal Pregnancies. NJOG 2012 Jan – June, 7 (1): 28-32
8. Sevine Inan, Muzaffer Sanci, Daniz Can, Seda Vatansever, Ozgur Oztekin, and Sivekar Tinar. Comparative morphological differences between umbilical cords from chronic hypertensive and preeclamptic pregnancies. Acta Med. Okayama, 2002, Vol. 56, No. 4, pp. 177-186.
9. Constanlin Ilie, Narcis Hrubaru, Rodica Ilie, Ileana Enatescu, Elena Bernad, Iulian Velea, Virgil Radu Enatescu, Zoran Popa, Delia Checiu. Histoligical Modifications of the Umbilical Cord in Pregnancy induced Hypertension. Jurnalul Pediatrului – Year X, Vol. X, Nr. 39-40, July-December 2007.
10. Pushpa Goswami, Hem Lata, Samreen Memon, Lal Baksh Khaskhelli. Excessive placenta Calcification observed in PIH patients and its relation to fetal Outcome. JLUMHS September –December 2012; Vol 11: No. 03