Evaluation of Umbilical artery Blood velocity in pregnancy Complicated by hypertension.

تقييم سعة جريان الدم في الحبل السري أثناء الحمل عند التعرض لإرتفاع ضغط الدم

Thesis submitted in partial fulfillment of the requirement of the M.Sc in Diagnostic Medical Ultrasonography

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قال تعالى:

بسم الله الرحمن الرحيم

وما أوتيتم من العلم إلا

((قليلًاً

صدق الله العظيم

May, 2012
Dedication

"I wish to dedicate this work to Holy Prophet Muhammad (Peace be upon him) and his companions who laid the foundations of Modern civilization and paved the way for social, moral, political, economical, cultural and physical revolution."
Acknowledgment

In the beginning I would like to greatly thanks my supervisor Dr.Elsafi Ahmed For every knowledge, supporting and advancing that he gave to me.

Also I would like to thanks Dr.Ibrahim Daowd, Dr.Rihab and my colleague Thamer Baderelden and Esmat Kbasy for assessment in complete this work.

At last my thanks extend to my teachers and colleagues whom always support me.
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Abstract:

Doppler sonography of umbilical artery is a useful tool in detecting fetal complication in pregnancies with hypertension.

The aim of this study was to visualize the umbilical artery, measure the velocity of the umbilical artery and then compare Doppler findings of umbilical artery in patients with hypertension to those of normal pregnancies and to evaluate the diagnostic characteristics of these patients.

A total of 40 cases of hypertensive and 20 uneventful pregnancies as a control group between 27 - 38 wks of gestation have been studied with color Doppler scanner with
a 3.5 MHz curvilinear probe used for studying umbilical artery. The results of first Doppler examination have been taken into consideration for the study. the study conducted in Different hospitals in Khartoum state, specially the Soba hospital from January to May 2012.

Data analyzed by using Microsoft excel. Ethical considered as no individual patient’s details have been throughout this study.

The result shows that the mean resistive index RI, pulsatility index PI and Systole\Diastole ratio were significantly higher In hypertensive patients than control group.

The cases with abnormal BP was 40 and normal 20 patient ,the incidence in percentage 65% for abnormal and 35% for normal. For PI above 1:00 considered abnormal, the study showed there was 51% abnormal and 49% normal PI. For S/D ratio above to 3:00 considered abnormal the study showed abnormal 42% and the normal 58%. For RI above to 0.7 considered abnormal the study shows abnormal 30% and the normal 70%.

In conclusion Doppler indices seem to be more appropriate tools to evaluate the change in blood flow in the Umbilical cord during pregnancy.
استخدام الدوبلر في الموجات الصوتية للشريان السري هو أداة مفيدة جداً في الكشف عن المضاعفات الجنينية في حالات الحمل وارتفاع ضغط الدم.

وكان الهدف من هذه الدراسة هو تصوير الشريان السري، وقياس سرعة الدم فيه، ثم مقارنة هذه النتائج بالنسبة للمرضى الذين يعانون من مرضاً ارتفاع ضغط الدم إلى حالات الحمل الطبيعي، وتقدير الخصائص التشخيصية لهذه الحالات.

وقد نمت الدراسة في 60 حالة، منها 20 حالة حمل طبيعي، و40 حالة حمل مرضية تعاني من ارتفاع ضغط الدم. وقد كانت نسبة 35% من حالات الحمل الطبيعي و65% من حالات الحمل غير الطبيعي.

وقد أخذ في الاعتبار أن أي زيادة في PI فوق 1.00 فهي زيادة غير طبيعية، فكانت بنسبة 49% للطبيعي و51% للفئتين يعانون من ارتفاع ضغط الدم. وأما معدل S/D فكانت بنسبة 49% للطبيعي و51% للفئتين يعانون من ارتفاع ضغط الدم، ونسبة 58% للطبيعي و42% للفئتين.

وقد أخذ في الاعتبار أن أي زيادة في RI فوق 0.7 فهي زيادة غير طبيعية، فكانت بنسبة 70% للطبيعي و30% للفئتين يعانون من ارتفاع ضغط الدم.

حددت الدراسة عمر الجنين بين 27-38 إسبوع من فترة الحمل، 3.5 ميقاتي. تم استخدام البوليغراف لقياس ضغط الدم، وتم قياس سرعة الدم في الشريان السري من خلال استخدام الدوبلر. وتم التحليل الاحصائي باستخدام نتائج الدراسة الأولية في نهاية الدراسة.

وقد تم تحليل البيانات باستخدام مايكروسفت إكسل. كما أخذت في الاعتبار الجوانب الأخلاقية في هذه الدراسة، باحترام خصوصية المرضى.
List of abbreviations:

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<tr>
<td>RI</td>
<td>Resistive index</td>
</tr>
<tr>
<td>PI</td>
<td>Pulsatility index</td>
</tr>
<tr>
<td>S/D ratio</td>
<td>Systolic/Diastolic ratio</td>
</tr>
<tr>
<td>UAs</td>
<td>Umbilical arteries</td>
</tr>
<tr>
<td>IUGR</td>
<td>Intra uterine gross retardation</td>
</tr>
<tr>
<td>2D</td>
<td>Two dimensional</td>
</tr>
<tr>
<td>GA</td>
<td>Gestational age</td>
</tr>
<tr>
<td>EVS</td>
<td>Endo-vaginal scan</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>PIH</td>
<td>Pregnancy induce hypertension</td>
</tr>
<tr>
<td>FVWs</td>
<td>flow velocity waveforms</td>
</tr>
<tr>
<td>CDS</td>
<td>Colour Doppler sonography</td>
</tr>
<tr>
<td>BP</td>
<td>Blood pressure</td>
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<td>AEDFV</td>
<td>Absent end diastolic flow velocity</td>
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<td>1</td>
<td>Sonographic images of the umbilical cord.</td>
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<td>Development of the umbilical cord.</td>
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<td>The umbilical cord including both abdominal and placental</td>
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insertions

4 Tow arteries red coiling around the central vein.

5 Absent end-diastolic flow of the umbilical artery in the first trimester (physiologic) with pulsations of the umbilical vein (physiologic).

6 Normal flow velocity waveforms of the umbilical artery in the third trimester.

7 Fetal neutrophil migration through the umbilical cord.

8 Umbilical cord braiding in a monochorionic monoamnionic twin placenta.

9 Loss of Wharton’s jelly.

10 Single umbilical artery.

11 Discordant umbilical arteries.

12 Hyrtl anastomosis.

13 Umbilical Cord Prolapse.

14 The images show Vasa previa.

15 The images show Nuchal cord.

16 Color Doppler ultrasound images show fetus with a single loop of umbilical cord around the fetal neck.

17 The image show Umbilical cord
knots.

Umbilical cord knots shown in 2D Doppler US

The images show umbilical cord cyst.

Umbilical cord hematoma.

Insertion of umbilical cord into chorionic plate.

Therapeutic cordocentesis occasionally leads to umbilical vessel hemorrhage.

Doppler flow ultrasound of the umbilical cord.

Determine the amount of blood flow during diastole.

Illustrates absent diastolic flow during diastole.

Illustrates reverse diastolic flow during diastole (blue circle).