Comparison between efficacy of first trimesteric Subchorionic haematoma and cervical length in prediction of preterm labour

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Abstract: Background: Preterm labour is the presence of regular uterine contraction in combination with cervical changes with or without intact membrane before 37 completed weeks. Two-thirds of preterm births occur because women go into spontaneous labor with intact or ruptured membranes; the other third result from indicated preterm deliveries for potentially life threatening conditions (e.g. pre-eclampsia) or fetal complications (e.g. intrauterine growth restriction). Spontaneous premature labor has been associated with multifactorial causes including demographic factors, stress, infections and genital inflammations. Bacterial vaginosis is also associated with spontaneous preterm birth. Preterm labor are still a major problem in obstetrics. **Methods:** 200 women; 100 pregnant women with first trimester subchorionic haematoma and or short cervix (below 3 cm) and 100 pregnant women with normal cervical length and without subchorionic haematoma. **Results:** The incidence of preterm labor was high among study (27%) than among control group (8.7%) with high statistically significant difference. **Conclusions:** Early assessment of all pregnant women in the first trimester by ultrasound for any abnormality as SCH and confirmation by cervical ultrasound in the second trimester were important to predict preterm birth outcome and the presence of first trimesteric SCH alone associated with increased risk of preterm labor, but if the SCH was associated with short cervix the risk of preterm labor more increased.

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Introduction

Preterm labor has a common physiological pathway. This pathway includes mainly processes at the level of the uterus such as changes to myometrial contractility, ripening/remodeling of the cervix and activation of the decidua and amnion and these changes are mediated by prostaglandins. Activation of individual components of the common pathway may occur synchronously or a synchronously **(Antonín et al., 2014).**

Preterm labour is the most common cause of death among infants worldwide about 15 million babies are preterm each year (5% to 18% of all deliveries) **(Smith et al., 2013).** Bed rest is one of the most interventions used for management of preterm labor. However, there were no studies that evaluated the effectiveness of bed rest to prevent preterm labor **(Trivedi et al., 2015).** Hydration may be used in women with preterm labour which reduce uterine contractility by increasing uterine blood flow and by decreasing pituitary secretion of antidiuretic hormone and oxytocin **(Stan et al., 2013).**

Subchorionic hematoma (SCH), intrauterine hematoma or retro chorial hematoma are common ultrasonographic findings that may be associated with first-trimester bleeding. The incidence of SCH in the first trimester in a general obstetric population is 3.1% **(Soldo et al., 2013)** and the frequency of SCH is significantly higher in the in vitro fertilization about 22.4% **(Asato et al., 2014).** Intrauterine subchorionic hematomas in the first trimester of pregnancy have been described as risk factors for adverse maternal and neonatal complications as fetal growth restriction and preterm delivery **(Jauniaux et al., 2005).**

A short cervix in the second trimester is our best predictor of spontanouse preterm labor **(Berghella et al., 2011).**

Patients and Methods:

The present case control study included 200 pregnant women; 100 of them had subchorionic hematoma (SCH) with or without short cervix (4 of them were missed). This group was further redivided into A & B. (A) SCH alone and (B) SCH with short cervix and 100 control cases without SCH or short cervix (9 of them were missed). Both groups were compared regarding the incidence of preterm labor. The study conducted at Al-Azhar University hospital (New Damietta) and Damietta specialized hospital during the period from the 1st of December 2015 to the last of December 2016 participated after oral and informed consent with the following criteria:

Inclusion criteria: Singleton gestation, cervical

dilatation < 3 cm by digital examination, temperature < 38ºC or the absence of fetal tachycardia, no history of subsequent cervical cerculage, the absence of a major uterine anomaly and the absence of maternal or placental diseases. All women with any of the following will be excluded: Multi fetal gestation, cervical dilatation > 3 cm by digital examination, temperature >38ºC or the presence of fetal tachycardia, history of subsequent cervical cerculage, the presence of a major uterine anomaly and the presence of maternal or placental diseases.

The following were taken

1- Full history taking: included age, parity, history of infertility and its type, duration of infertility and any other medical or surgical history.

2-Complete clinical examination: included general and full gynecological examination.

3- Investigations: Complete blood count (CBC), white blood cells (WBCs 103/ul), urine analysis and ultrasound scan for SCH and cervical length measurement.

Ultrasound scan was performed using a Voluson 730 Pro machine (USA) or Toshiba xerio 100 (Japan), ultrasound machine, equipped with a 7-10 MHz transvaginal probe.

Detection of first trimester subchorionic hematoma by ultrasound. SCH diagnosed sonographically where a hematoma appear as a crescent-shaped, sonolucent fluid collection behind the fetal membranes or the placenta. The volumes of the hematomas were estimated by measuring the maximum transverse, antero-posterior and longitudinal diameters, multiplying these values by a constant of 0.523 as was suggested by **Retha et al. (2015).**

The technique of measuring CL has been well described **(Berghella, 2011).** The patient examined with an empty bladder to avoid dynamic cervical changes. The TVUS probe was introduced into the anterior vaginal fornix under real-time visualization. A mid-sagittal view of the cervix was obtained. The probe was then withdrawn just enough to allow the image to blur and then advanced just until the image comes back into focus. This sequence avoids excessive probe pressure on the cervix, which can result in falsely lengthened cervical measurements. The on-screen electronic calipers were placed at the notches representing the internal os and external cervical os, identifying the bounds of the cervical length measurement. Three measurements were taken and the shortest of the three is reported as the cervical length.

Statistical Analysis of Data:

Statistical Analysis were performed by using statistical software SPSS version "18" categorical variations were compared using mean, standard deviation (SD) and student t-test. Statistical significance was defined as P value < 0.05.

Results:

In the present study the demographic data of the studied groups Age and BMI were nearly comparable between both cases and controls (age: 26.1±2.9 Vs 26.3±2.7 years and BMI: 30.1±2.4 Vs 29.2± 1.8 Kg/m^2); while parity was high among SCH (1.95±1.1) than among control cases (1.4±0.99) with statistically significant difference **(Table 1).**

Table (1): Demographic data of studied groups

Variable	Study group (n= 96)	Control group (n= 91)	P
Age (years) Mean± SD	26.1±2.9	26.3±2.7	0.4
BMI (Kg/m^2) Mean± SD	30.1±2.4	29.2±1.8	0.09
Parity Mean± SD	1.95±1.1	1.4±0.99	0.04*

*: significant

The study group was classified according to presence or absence of short cervix into two subgroups; sub chorionic hematoma without short cervix (SCH) (A) (81.2%) and SCH with short cervix (B) (18.8%) **(Table 2).**

Table (2): Classification of the study group according to presence or absence of short cervix

	SCH alone (A)	SCH with short cervix (B)
Study group (n= 96)	78 (81.2%)	18 (18.8%)

The size of SCH is small <20 mm3 in (44%) and large >20 mm3 in (56%) of cases. Regarding site of SCH, most of them were corporal (74%) and other is supracervical (26%) **(Table 3).**

Table (3): Classification of SCH among studied group according to size and site

Variable	No (%)
Size of SCH	
Small (<20 mm^3)	42 (44%)
Large (>20 mm^3)	54 (56%)
Site of SCH	
Corporal	71 (74%)
Supracervical	25 (26%)

Table (4): preterm labor among studied groups

Variable	Preterm labor	P
Study (96)	26 (27%)	0.0012*
Control (91)	8 (8.7%)	

The incidence of preterm labor was high among study (27%) than among control group (8.7%) with high statistically significant difference **(Table 4).**

The incidence of preterm labor was high among large size SCH alone of the study cases (26.8%) than among small size SCH alone of the study cases (21.6%) with high statistically significant difference when compared with control group. But the preterm labor outcome was high among small size SCH with short cervix of the study cases (42.8%) than among large size SCH with short cervix of the study cases (36.3%) with high statistically significant difference when compared with control group **(Table 5).**

Table (5): preterm labor among different classes of studied groups

Variable			Preterm labor	P
Study (96)	**SCH alone (78)**	**Small size (37)**	8 (21.6%)	0.04*
		Large size (41)	11(26.8%)	0.006*
	SCH with short cervix (18)	**Small size (7)**	3 (42.8%)	0.005*
		Large size (11)	4(36.3%)	0.007*
Control (91)			8(8.7%)	

Discussion:

Preterm delivery, defined as birth before 37 weeks of gestation, occurs in 5-13% of all deliveries worldwide and is a major cause of perinatal mortality and morbidity **(Gert-Jan et al., 2013).** Prediction of preterm labor by a simple techniques help in early intervention and prevention of preterm labor **(Lakhani et al., 2010).**

Subchorionic hematoma is the pooling of blood between the chorion and membrane surrounding the embryo and the uterine wall and it is about 3.1% of all pregnancies, subchorionic hematomas are common ultrasonographic findings that may be associated with first-trimester bleeding. The hematomas are usually hypoechoic and crescent-shaped areas separating the uterine wall and the chorion **(leite et al., 2006).**

In this study we compare between efficacy of first trimesteric Subchorionic haematoma and cervical length in prediction of preterm labour.

In the present study, age and BMI were nearly comparable between both cases and controls (age: 26.1±2.9 Vs 26.3±2.7 years) and (BMI: 30.1±2.4 Vs 29.2± 1.8 Kg/m2).

These results agree with **Kim et al. (2011) and Palatnik and Grobman (2015)** who reported that the mean age and BMI was not different between the study and the control group, and also, in agreement with **Yael et al., (2015)** who noticed that maternal age had no significant difference of prediction of preterm labor.

Bushtyreva et al. (2015) also reported that the mean age was not different between the study and the control group (29.7±4.3 among cases Vs 29.4±5.4 among control without SCH).

In contradiction, **Greco et al. (2011)** noticed that the risk for spontaneous early preterm delivery increases with maternal age in women with short cervix. It may be due to large number of his cases (10870) singleton pregnancies and examined sample with short cervix only not associated with SCH.

In this study, parity increased among SCH (1.95±1.1) more than among control cases (1.4±0.99) with statistically significant difference and this result agree with **Palatnik and Grobman (2015)** who noticed that the parity increased among study cases and also, **Fernandes and Chandra (2015)** reported that the risk of preterm labor increased with parity.

In contradiction, **Kim et al. (2011)** reported that parity not significantly difference between study (0.5±0.6) and control group. It may be due to low parity in both study and control groups.

In the present study, the study cases classified into SCH alone (81.2%) and SCH with short cervix (18.8%) and this study in agreement with **Palatnik and Grobman (2015)** who reported that some cases of SCH associated with short cervix and also, in agreement with **Bushtyreva et al. (2015)** who done their work on case control study included 194 pregnant women at 6 to 12 weeks of pregnancy; 115 women with SCH (Group 1) and the control group (Group 2) included 79 apparently healthy pregnant women without SCH. In this study there were 22 (19%) cases associated with short cervix and the short cervix occurred due to presence of SCH.

In the present study, SCH classified according to size into small (44%) and large (56%). Regarding site of SCH, most of them are corporal (74%) and other is supracervical (26%).

This study similar to classification of **Al-Bassam and Dahash (2015)** who classified SCH according to size into small (40%) and large (60%) and also in agreement with **Bushtyreva et al. (2015)** who noticed that corporal localization of the hematoma was more common than supracervical 71% and 29% respectively.

In contradiction, **Leite et al. (2006)** found that the hematoma was located in only one site (anterior, posterior, cervical or fundal) in (73%) patients. The hematoma covered more than one site in (27%).

In the present study, the preterm labor outcome

was significant high among study (27%) than among control cases (8.7%) and this study in agreement with Arthur et al (2003) who found that preterm labor among cases with SCH was (25.5%) and in agreement with **Donogol et al (2011)** who showed that preterm birth was 20.75% and also **Retha et al (2015)** who found that the preterm birth was 21% among cases with SCH. Also, in agreement with **Van oppenraaij et al (2009), Norman et al. (2010) and Palatnik and Grobman (2015)** who noticed that the preterm labor was increased among cases with SCH.

In contradiction **Janowicz-Grelewska and Sieroszewski (2013)** showed that there was no relation between SCH and premature birth. It may be due to they studied on large sample size on study group compared with small number on control group (119 with SCH Vs 66 control) and all individual in this study suffered from symptoms of a threatening miscarriage.

In the present study, the preterm labor outcome was high among large size SCH alone of the study cases (26.8%) than among small size SCH alone of the study cases (21.6%) with high statistically significant difference. But the preterm labor outcome was high among small size SCH with short cervix of the study cases (42.8%) than among large size SCH with short cervix of the study cases (36.3%) may be due to increase abortion outcome in cases with large size SCH and short cervix with high statistically significant difference and this in agreement with **Al-Bassam and Dahash (2015)** who noticed that preterm birth high among large SCH than small SCH and also, with **Baldawa (2014)** who showed that the large SCH on ultrasound increased risk of preterm labor.

Johns et al. (2003) showed that a significant correlation between large hematomas and adverse outcome of pregnancy including preterm labor. Kyser (2012) reported that large hematoma associated with increased risk of preterm delivery.

In contradiction, **Ben-Haroush et al. (2003)** reported that size of SCH not affect the pregnancy outcome including preterm labor may be due to large sample size (2556), they found the incidence of SCH was only 9% and examined patient with vaginal bleeding only during the first 20 gestational weeks and also, **Donogol et al (2011) and Ketut and Anak Agung (2011)** found that when hematoma is small and asymptomatic it may not be of clinical significance but, the larger hematomas may be associated with poorer outcomes.

Leite et al. (2006) showed that presence of a very large first-trimester hematoma is associated with a 46% risk of adverse pregnancy outcome. In this study the percentage ratio of pregnancy outcome more than the present studies (28.8%). It may be due to the pregnancy outcome in this study including spontaneous abortion and premature rupture of membranes but in the present study the outcome including preterm labor only.

Tuuli et al. (2011) reported that the first-trimester SCH is associated with both a shorter cervical length and preterm birth and also in agreement with **Palatnik and Grobman (2015)** who reported that the presence of a SCH was significantly associated with a shorter mean cervical length and preterm birth. The first-trimester SCH is associated with both a shorter cervical length and preterm birth suggests the possibility that mechanisms other than cervical shortening may be involved in preterm birth pathogenesis.

Hiersch et al. (2014), Shiozaki et al. (2014) and Yassin et al. (2015) showed that a significant relationship between a short cervix detected by transvaginal ultrasound and preterm labor outcome.

In the present work, the preterm labor among cases suffering from SCH with short cervix is high in small SCH than large SCH (42.8% Vs 36.3%) and this in agreement with **Retha et al. (2015)** who showed that a significant correlation between large hematomas and spontaneous miscarriage, large volumes increased 2.4 fold the risk of spontaneous miscarriage.

In contradiction, **Al- Bassam and Dahash (2015)** noticed that preterm birth high among large SCH than small SCH. This may be due to the present study include another risk factor (short cervix) beside SCH that lead to increase the risk of spontaneous miscarriage.

References:

1. Al-Bassam A. N. and Dahash M. K. (2015): Pregnancy Outcome of Primigravida with Threatened Miscarriage and Subchorionic Hematoma. The Iraqi Postgraduate Medical Journal, 14 (1): 14-22.
2. Antonín P., Michal K. and Michaela D. (2014): Progesterone, inflammation and preterm labor. Journal of Steroid Biochemistry & Molecular Biology, 139: 159– 165.
3. Asato K., Mekaru K., Heshiki C., Sugiyama H., *et al.* (2014): Subchorionic hematoma occurs more frequently in in vitro fertilization pregnancy. Eur J Obstet Gynecol Reprod Biol., 181:41-44.
4. Baldawa P.S. (2014): Imaging Diagnostic Dilemma of Large Subchorionic Hematoma. Indian Journal of Clinical Practice, 24 (10): 970-973.
5. Ben-Haroush A., Yogev Y., Mashiach R. and Meizner I. (2003): Pregnancy outcome of threatened abortion with subchorionic hematoma: possible benefit of bed-rest? IMAJ, 5: 422-424.
6. Berghella V., Rafael T. J., Szychowski J. M., Rust O. A. and Owen J. (2011): Cerclage for short cervix on ultrasonography in women with singleton gestations and previous preterm birth. Obstet Gyneco.,117: 663-671.
7. Bushtyreva I. O., Kuznetsova N. B., Victoria V. B.,

Anna V. K. and Maria P. D. (2015): Pregnancy Outcomes in Pregnant Women with Subchorionic Hematoma. International Journal of Biomedicine, 5(3): 137-140.
8. Dongol A., Mool S. and Tiwari P. (2011): Outcome of Pregnancy Complicated by Threatened Abortion. Kathmandu Univ Med J., 33: 41-44.
9. Fernandes S. and Chandra S. (2015): A study of risk factors for preterm labour. Int J Reprod Contracept Obstet Gynecol., 4(5):1306-1312.
10. Gert-Jan V. B., Jolande Y., William A. G., Patrick M. B., Brent C. and Ben W. M. (2013): Cost-effectiveness analysis of cervical length measurement and fibronectin testing in women with threatened preterm labor. Am J Obstet Gynecol., 209: 436-438.
11. Greco E., Gupta R., Syngelaki A., Poon L. C. Y. and Nicolaides K. H. (2011): First-trimester screening for spontaneous preterm delivery with maternal characteristics and cervical length. Fetal Diagnosis and Therapy, 31 (3): 154–161.
12. Hiersch L., Yariv Y. M., Noam D., Israel M., Ron B. and Nir M. (2014): The role of cervical length in women with threatened preterm labor: is it a valid predictor at any gestational age? Am J Obstet Gynecol., 14: 211-219.
13. Janowicz-Grelewska A. and Sieroszewski P. (2013): Prognostic significance of subchorionic hematoma for the course of pregnancy. Ginekol Pol., 84(11): 944-949.
14. Johns J., Hyett J. and Jauniaux E. (2003): Obstetric outcome after threatened miscarriage with and without a hematoma on ultrasound. Obstetric Gynecol., 102(3):483-487.
15. Ketut R.D. and Anak Agung N.J. (2011): Subchorionic Hematoma on Threatened Abortion as Risk Factors Occurrence of Spontaneous Abortion. Jln. Pulau Bali., 35 (1):170-172.
16. Kim A. M., Lee B. S., Yong-Won P. and Kyung S. (2011): Serum markers for prediction of spontaneous preterm delivery in preterm labour. European Journal of Clinical Investigation, 41 (7): 773–780.
17. Lakhani P. D., Bansode A. S., Nanavati M. S. and Desai S. V. (2010): role of cervical length as apridector of preterm labor and acomparison of transabdominal versus transvaginal ultrasound in determining the accuracy of cervical length. South Asian Federation of Obstetrics and Gynecology, 2 (2): 129-131.
18. Leite J., Ross P., Cristina Rossi A. and Jeanty P. (2006): Prognosis of Very Large First-Trimester Hematomas. the American Institute of Ultrasound in Medicine. J Ultrasound Med., 25:1441–1445.
19. Norman S. M., Odibo A. O., Macones G. A., Dicke J. M., Crane J. P. and Cahill A. G. (2010): Ultrasound-detected subchorionic hemorrhage and the obstetric implications. Obstet Gynecol., 116(2): 311-315.
20. Palatnik A. and Grobman W. A. (2015): The relationship between first-trimester subchorionic hematoma, cervical length, and preterm birth. Am J Obstet Gynecol. 213(3):403-407.
21. Retha p., Mohammed S. S. and Hassen P. O. (2015): Pregnancy outcome in women with subchorionic haemorrhage detected in first and second trimester of pregnancy. Zanco J. Med. Sci.,19 (2): 1035-1040.
22. Shiozaki A., Yoneda S., Nakabayashi M., Takeda Y., et al. (2014): Multiple pregnancy, short cervix, part-time worker, steroid use, low educational level and male fetus are risk factors for preterm birth in Japan: a multicenter, prospective study. J Obstet Gynaecol Res., 40(1): 53-61.
23. Smith A., Jones B. and Clements S. (2013): Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet, 385: 117–171.*
24. Soldo V., Cutura N. and Zamurovic M. (2013): Threatened miscarriage in the first trimester and retrochorial hematomas, sonographic evaluation and significance. Clin Exp Obstet Gynecol., 40(4): 548-550.
25. Stan C., Boulvain M., Hirsbrunner-Amagbaly P. and Pfister R. (2013): Hydration for treatment of preterm labour. Cochrane Database Syst Rev., 2: 1-9.
26. Trivedi S.S., Manju P. and Agrawal S. (2015): Management of High-Risk Pregnancy. Text book, 2nd edition P. 52.
27. Tuuli M. G., Norman S. M., Odibo A. O., Macones G. A. and Cahill A. G. (2011): Perinatal outcomes in women with subchorionic hematoma. A systematic review and meta-analysis. Obstet Gynecol., 117(5):1205-1212.
28. Van oppenraaij R. H. F., Jauniaux E., Christiansen O. B., Horcajadas J. A., Farquharson R. H. and Exalto N. (2009): Predicting adverse obstetric outcome after early pregnancy events and complications: a review. Oxford journals Medicine Human Reproduction Update, 15 (4) 409- 421.
29. Yael S. T., Alon S. and Richard N. B. (2015): Prolonged Second Stage of Labour and the Risk for Subsequent Preterm Birth. J Obstet Gynaecol Can., 37(4): 324–329.
30. Yamada T., Atsuki Y., Wakasaya A., Kobayashi M., Hirano Y. and Ohwada M. J. (2012): Characteristics of patients with subchorionic hematomas in the second trimester. Obstet Gynaecol Res., 38(1):180-184.
31. Yassin K., Miskeen E. and Gerais S. (2015): The Role Of Cervical Length Assessment In Management Of Low And High Risk Of Preterm Labour, Review Article. NMJ, 3 (16) 1858-1869.