

Ultrasound monitoring of cervical length in twin pregnancies.

Monitoring échographique de la longueur du col utérin en cas de grossesse gémellaire.

Kaouther Dimassi¹, Ines Bouriel¹, Amel Triki¹, Ali Mrabet², Mohamed Faouzi Gara¹

1-Unité de diagnostic prénatal, service de gynécologie-obstétrique- hôpital Mongi Slim la Marsa / Université Tunis El Manar/ Faculté de médecine de Tunis

2-Laboratoire d'épidémiologie et de médecine préventive / Université Tunis el Manar/ Faculté de médecine de Tunis

R É S U M É

Introduction : L'accouchement prématuré reste la complication majeure des grossesses gémellaires. Un col utérin raccourci entre 20 et 24 semaines d'aménorrhée est un signe prédictif d'accouchement prématuré chez les patientes asymptomatiques. Ceci dit, il n'y a pas de recommandations pour des mesures itératives du col utérin chez ces grossesses à risque.

Objectif: Evaluer les bénéfices d'un monitoring mensuel de la longueur du col utérin chez les grossesses gémellaires asymptomatiques.

Méthodes: Il s'agit d'une étude longitudinale comparant deux groupes de grossesses gémellaires (un groupe avec monitoring échographique mensuel et systématique de la longueur du col par voie endo-vaginale et un groupe témoin) en termes de taux de dépistage de menace d'accouchement prématuré, d'âge gestationnel au moment du diagnostic, de temps gagné par la tocolyse et de terme gestationnel moyen au moment de l'accouchement.

Résultats: Quatre-vingt-neuf grossesses gémellaires ont été incluses : 35 patientes avaient un monitoring mensuel et systématique de la longueur cervicale (groupe 1) versus 64 témoins (groupe 2). Une corrélation significative a été objectivée entre une longueur cervicale mesurée entre 22 et 24 semaines d'aménorrhée inférieure à 30 mm et un accouchement prématuré avec une bonne spécificité (100%), une bonne valeur prédictive positive (100%) mais une sensibilité de 45%. Un gain significatif a été mis en évidence dans le groupe 1 en termes de taux de dépistage de menace d'accouchement prématurée ($p=0,018$), de temps gagné par la tocolyse ($p=0,023$), et de terme gestationnel moyen au moment de l'accouchement ($p=0,046$).

Conclusion : Le monitoring systématique de la longueur cervicale serait un moyen de dépistage des menaces d'accouchement prématuré chez les grossesses gémellaires asymptomatiques.

M o t s - c l é s

Grossesses gémellaires, monitoring échographique, longueur cervicale.

S U M M A R Y

Background: Preterm delivery is the major cause of adverse outcomes in twin pregnancy. A shortened cervix at 20-24 weeks of amenorrhea is a good predictor of preterm birth in asymptomatic patients. However, there are no recommendations for serial cervical length measurements for these high risk pregnancies.

Objectives: To evaluate the benefits from monthly cervical length monitoring in asymptomatic twin pregnancies.

Methods: This was a prospective study. We compared two groups of twin pregnancies (groupe 1: patients with a monthly and systematic transvaginal ultrasound measurement of the cervical length and groupe2 : patients without monitoring of cervical length) in terms of premature labor screening, mean gestational age at the diagnosis of preterm labor, time saved by tocolysis in case of preterm labor and mean gestational age at delivery.

Results: Ninety nine twin pregnancies were included: 35 patients had a systematic, monthly cervical length (group1) and 64 women had a traditional prenatal care without monitoring of cervical length (group2). A significant relationship between a cervical length measured between 22 and 24 weeks of amenorrhea inferior to 30 mm and preterm labor with a high specificity (100%) and a high positive predictive value (100%). The sensitivity remains average (45%). A significant benefit was demonstrated through this systematic ultrasound measurement of cervical length for the screening of preterm labor ($p=0.018$), the time saved by tocolysis ($p=0.023$), as well as the medium gestational age at birth ($p=0.046$).

Conclusion: Serial cervical length measurements seems to be a significant predictor of early preterm birth in asymptomatic twin pregnancies.

Key - words

Twin pregnancy, ultrasound monitoring, cervical length.

The rate of multiple pregnancies is showing a significant increase in all over the world.

Preterm delivery, defined as birth before 37 weeks of amenorrhea (WA), is the major cause of adverse outcomes. It is observed in approximately 54% of all twins [1]. Despite advancing knowledge of the risk factors and mechanisms associated with preterm labor (PL) and delivery, the twin preterm birth rate has risen 36% in the United States during the last quarter century [2]. Therefore, there is an urgent need to develop cost-effective tests for the prediction of preterm birth in twin pregnancies. Although universal screening is controversial, cervical length (CL) assessment has been useful in the management of these patients. A shortened cervix identified by transvaginal ultrasound (TVUS) at 20-24 weeks' gestation is a good predictor of preterm birth in asymptomatic twin pregnancies [2-4]. However, there are no recommendations about serial CL measurements.

The objective of this study was to evaluate the benefits from monthly CL monitoring in asymptomatic twin pregnancies in terms of PL screening, time saved by tocolysis and medium gestational age (GA) at birth.

METHODS

This was a prospective and comparative study conducted over a period of 15 months. We selected all multiple pregnancies managed in our obstetrics and gynecology unit.

Gestational age was based on the known last menstrual period and confirmed by first trimester ultrasound, or based on first trimester ultrasound in all patients.

Patients were enrolled in two groups:

- In the first group (G1), we included patients managed in our department right from the first trimester with a monthly and systematic TVUS measurement of the CL. Initial CL measurement started between 22 and 24 WA, followed by serial CL measurements each month. All CL measurements were measured by 4 – 8 MHz transvaginal probes (ULTRASONIX, SONIX OP) with an empty bladder with the optimal image [5]. The shortest functional CL recorded was used as this has been found to be the most reproductive measurement [6].

- In the second group (G2), we included patients managed initially in other clinics with no monitoring of CL and who were transferred to deliver in our department during the same study period.

We compared the two groups of patients in terms of: PL screening rate, GA at the diagnosis of PL, time saved by tocolysis and GA at delivery.

Fisher exact test, Student t test, and multivariable analysis were used when appropriate (SPSS for Windows 16.0; SPSS Inc, Chicago, IL).

RESULTS

During the study period, 99 patients with twin pregnancies were supported in our unit: 35 patients were managed starting from the first trimester and were included in the first group. These patients had systematic monthly CL measurements. 64 women with twins had a traditional prenatal care or only had given birth in our department. These patients were included in the second group.

The mean age was significantly higher in the first group of patients. The main epidemiological characteristics of the two groups of patients are detailed in table 1.

Table 1 : Main epidemiological characteristics of the two groups of patients.

Epidemiological characteristics	Group 1	Group 2	p
Age (years)	35	32.5	0.27
Obesity (%)	5	7	0.85
Pregnancy obtained after assisted reproduction (%)	8.57	10.93	0.64
Premature delivery history (%)	1	2	0.58
Monochorionic pregnancies (%)	17.14	10.9	0.079

Group 1: patients with a monthly and systematic transvaginal ultrasound measurement of the cervical length; Group 2: patients without monitoring of cervical length

Of a total of 35 patients in G1, CL was inferior to 30 mm in 9 patients.

The terms of delivery according to the CL measured between 22 and 24 WA are detailed in Table 2.

Thus, There was a significant relationship between CL measured between 22 and 24 WA inferior to 30 mm and PL ($p = 0.02$). Similarly, we have found a high specificity (100%) and a high positive predictive value (PPV) (100%) of a CL inferior to 30 mm at 22 WA in the screening for PL. The sensitivity remains average: 45%.

In addition, the systematic and monthly monitoring of CL routinely performed in G1 had highlighted the following results:

- 11 patients had presented cervical changes before 34 WA. Among these patients, 6 (54.5%) had no uterine contractions. In G2, this screening was possible in only one patient (1/14) and the difference was significant between the two groups ($p = 0.018$).

- The medium GA at delivery was 34.7 [31.8-38.5] WA in

G1 versus 29 [27.8-38] WA in G2. This difference was significant ($p = 0.046$).

- The rate of premature birth was 63.6% in G1 versus 57.14% in G2 ($p=0.625$).

- The time saved by tocolysis was significantly different between the two groups, 5.5 WA in G1 against 2 WA in G2 ($p = 0.023$).

-36.3% of newborns were admitted to neonatal unit in G1 versus 50% in G2 ($p=0.407$).

Thus, we can conclude that there was a benefit from PL screening using systematic ultrasound CL measurement in terms of medium GA at delivery, and time saved by tocolysis. These results are summarized in table 3.

Table 2 : Mean gestational age at delivery in patients of group 1 according to the cervical length measured between 22 and 24 weeks of amenorrhea.

CL (22-24 WA)	Delivery before 34 WA (n)	Delivery between 34 and 37 WA (n)	Delivery after 37 WA (n)	Total
CL \leq 30 mm	6	3	0	9
CL $>$ 30 mm	3	8	15	26
Total	9	11	15	35

CL: Cervical length; WA: Weeks of amenorrhea; n: number

Table 3: Comparison of pregnancies outcomes between the two groups of patients.

CL (22-24 WA)	Delivery before 34 WA (n)	Delivery between 34 and 37 WA (n)	Delivery after 37 WA (n)	Total
CL \leq 30 mm	6	3	0	9
CL $>$ 30 mm	3	8	15	26
Total	9	11	15	35

Group 1: patients with a monthly and systematic transvaginal ultrasound measurement of the cervical length; Group 2: patients without monitoring of cervical length; GA: gestational Age; PL: premature labor; WA: weeks of amenorrhea; CL: cervical length.

DISCUSSION

In our study, we have demonstrated the importance of ultrasound in assessing the risk of preterm delivery, main

complication of twin pregnancies. Indeed, we found a significant relationship between CL measured between 22 and 24 WA inferior to 30 mm and premature delivery with $p = 0.02$.

Similarly, a significant benefit was demonstrated through this systematic CL measurement in: screening for PL ($p=0.018$), time saved by tocolysis ($p=0.023$), as well as medium GA at birth ($p=0.046$).

Although these significant results, one limitation should be mentioned which is the small number of patients. Thus, we must work to generalize this ultrasound management of twin pregnancies to all obstetrics units in our country.

Another limitation of our study lies in the application of these results into clinical practice with the well-known fact that the prediction of preterm birth does not necessarily lead to the prevention of preterm birth. Indeed, efforts to prevent preterm birth in twins have generally not been supported by prospective, randomized trials [5,7].

Although universal screening is controversial, CL assessment has been useful in the management of patients with preexisting risk factors for preterm delivery. Given that over half of all twins are delivered prior to term, an awareness of CL tends to impact patient counseling and the management of twin pregnancies [8]. Moreover, it has been shown that in twin pregnancies, only the obstetric history (history of premature labor) and ultrasonographic CL measurement are predictive of preterm delivery [9].

Despite the sometimes conflicting results in the literature, the CL measurement still of a great contribution in the management of patients with risk factors for preterm birth [10]. Among the various ultrasound measurements techniques, transvaginal measurements give the best results [11-13].

Similarly, all studies found a significant association between the CL decrease at 20-24 WA in twin pregnancies and preterm delivery [14, 15]. In a prospective study of 1163 twin pregnancies, To et al. [16] demonstrate that transvaginal ultrasound CL measurement between 22 and 24 WA is more relevant than the obstetric history to identify patients at risk of preterm delivery before 32 WA with a specificity of around 89%.

It is held that a CL measured at the second trimester lower than 20-25mm increases the risk of preterm delivery 3 to 5 times [10]. In a study of 251 women with twin pregnancy, Vayssi re et al. [17] demonstrate that a CL measured between 21 and 23 WA less than 25mm predicts preterm delivery before 32 weeks with a sensitivity of 38%, a specificity of 97% and a PPV of 38%. In our study, the threshold used was 30mm, and we have demonstrated a significant relation between a CL less than 30 mm and PL ($p=0.02$) with a high specificity (100%), and a high PPV (100%). The sensibility was 45%. Recently, Foxet al. illustrate via a study of 121 twin pregnancies [18], that changes of more than 20% in CL

between 2 measurements performed during the end of the second trimester are an important predictor of preterm birth; even if CL measured remains above 25mm.

This ultrasound monitoring of the CL, although the threshold for identifying women at risk of preterm delivery is variable from one study to another, and from one team to another, remains paramount in the management of twin pregnancies and in the prevention of preterm delivery .

CONCLUSION

Serial CL measurements are a significant predictor of early preterm birth in asymptomatic twin pregnancies although the threshold for identifying women at risk is variable from one team to another.

References

- Assunção RA, Liao AW, Brizot Mde L, Krebs VL, Zugaib M. Perinatal outcome of twin pregnancies delivered in a teaching hospital. *Rev Assoc Med Bras.* 2010;56(4):447-51.
- Martin JA, Hamilton BE, Sutton PD, et al. Births: final data for 2006. *Natl vital Stat Rep.* 2009;57:1-102.
- Goldenberg RL, Lams JD, Miodovnik M, et al. The preterm prediction study: risk factors in twin gestations. National institute of child health and human Development Maternal-Fetal Medicine Units Network. *Am J Obstet Gynecol.* 1996;175:1047-53.
- Guzman ER, Walters C, O Reilly-Green C, et al. Use of cervical ultrasonography in prediction of spontaneous preterm birth in twin gestations. *Am J Obstet Gynecol.* 2000;183:1103-7.
- Lams Jd, Goldenberg RL, Meis PJ, et al. The length of the cervix and the risk of spontaneous preterm delivery. *N Engl J Med.* 1996;334 :567-72.
- Yost NP, Bloom SL, Twickler DM, Levano KJ. Pitfalls in ultrasound cervical length measurements for predicting preterm birth. *ObstetGynecol.* 1999;93:510-6.
- Berghella V, Odibo AO, To MS, Rust OA, Althuisius SM. Cerclage for short cervix on ultrasonography : meta-analysis of trials using individual patient-level data. *Obstet Gynecol.* 2005;106:181-9.
- Christophe V, Guillaume B, Blondel B, et al. Twin pregnancies: guidelines for clinical practice from the French College of Gynaecologists and Obstetricians (CNGOF). *Eur J ObstetGynecolReprod Biol.* 2011;156(1):12-7
- Simpson LL. Ultrasound in twins: dichorionic and monochorionic. *SeminPerinatol.* 2013;37(5):348-58.
- Conde-Agudelo A, Romero R, Hassan SS, Yeo L. Transvaginal sonographiccervicallength for the prediction of spontaneous preterm birth in twin pregnancies: a systematic review and meta-analysis. *Am J ObstetGynecol.*2010;203:128-32
- To MS, Skentou C, Souka A, Nicolaides KH. Cervical assessment at the routine 23-weeks scan: problems with transabdominal sonography. *UtrasoundObstet Gynecol.* 2000;15:292-6.
- Andersen HF, Ansbacher R. Ultrasound: a new approach to the evaluation of cervical ripening. *SeminPerinatol.* 1991;15:140-8.
- Owen J, Neely C, Northen A. Transperineal versus endovaginalultrasonographic examination of the cervix in the midtrimester: a blinded comparison. *Am J Obstet Gynecol.* 1999;181:780-3.
- Gibson JL, Macara LM, Owen P, Young D, Macauley J, Mackenzie F. Prediction of preterm delivery in twin pregnancy: a prospective, observational study of cervical length and fetal fibronectin testing. *UtrasoundObstet Gynecol.* 2004;23:561-6.
- Crane JM, Hutchens D. Transvaginal sonographic measurement of cervical length to predict preterm birth in asymptomatic women at increased risk: a systematic review. *Ultrasound Obstet Gynecol.* 2008;31(5):579-87.
- To MS, Fonseca EB, Molina FS, Cacho AM, Nicolaides KH. Maternal characteristics and cervical length in the prediction of spontaneous preterm delivery in twins. *Am J ObstetGynecol.* 2006;194:1360-5.
- Vayssiere C, Favre R, Audibert F, et al. Cervical length and funneling at 22 and 27 weeks to predict spontaneous birth before 32 weeks in twin pregnancies: a French prospective multicenter study. *Am J Obstet Gynecol.* 2002;187:1596-604.
- Fox NS, Rebarber A, Klausner CK, et al. Prediction of spontaneous preterm birth in asymptomatic twin pregnancies using the change in cervical length over time. *Am J Obstet Gynecol.* 2010;202(2):155.e1-4.