

An appraisal of computed tomography pelvimetry in patients with previous caesarean section

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تقييم قياسات الحوض بالتصوير المقطعي المحوسب لدى من سبق أن أجرين عملية قيصرية
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خلاصة: أجريت هذه الدراسة لتعيين قيمة قياسات الحوض بالتصوير المقطعي المحوسب لدى من سبق لهم إجراء عمليات قيصرية. فمن بين 219 حاملاً أجرين عملية قيصرية واحدة من قبل، أجرت مئة حامل قياسات الحوض بالتصوير المقطعي المحوسب، بينما كانت هناك مجموعة شاهدة مكونة من 119 امرأة لم يجربن تلك القياسات. وفي المجموعة التي أجرت القياسات، ولدت العملية القيصرية 51.0% بينما أجرت 28.0% منهن عملية قيصرية انتخابية بسبب تضيق الحوض كما أوضحته قياسات الحوض بالتصوير المقطعي المحوسب. كما أن 23.0% أجرين عملية قيصرية عاجلة بعد محاولة التوليد. أما في المجموعة الشاهدة فقد أجرت 21.8% عملية قيصرية عاجلة. ولم تكن هناك فروق يعتد بها إحصائياً بين المجموعتين فيما يتعلق بأوزان المواليد أو أحراز أبغار. وخلاصة القول إن قياسات الحوض بهذه الطريقة أدت إلى زيادة معدل العمليات القيصرية، الأمر الذي يوحي بأن قياسات الحوض بالتصوير المقطعي المحوسب قبل التوليد المهبل عند من سبق لهم إجراء عملية قيصرية طريقة محدودة القيمة.

ABSTRACT This study was conducted to determine the value of computed tomography (CT) pelvimetry in patients with previous caesarean section. Of 219 pregnant women with one previous caesarean section, 100 had antenatal CT pelvimetry and a control group of 119 women had no CT pelvimetry. In the CT pelvimetry group, 51.0% delivered by caesarean section, 28.0% underwent elective caesarean section for contracted pelvis based on the findings of CT pelvimetry and 23% underwent emergency caesarean section after a trial labour. In the control group, 21.8% underwent emergency caesarean section. The differences in birth weight and Apgar scores between the groups were not statistically significant. CT pelvimetry increased the rate of caesarean delivery, suggesting that CT pelvimetry before a vaginal birth after a previous caesarean delivery is of limited value.

Une évaluation de la pelvimétrie par tomodensitométrie chez des patientes ayant subi une césarienne

RESUME Cette étude a été réalisée pour déterminer la valeur de la pelvimétrie par tomodensitométrie chez des patientes ayant subi une césarienne. Sur les 219 femmes ayant subi une césarienne, 100 avaient eu une pelvimétrie par tomodensitométrie anténatale et un groupe témoin de 119 femmes n'avait pas eu de pelvimétrie par tomodensitométrie. Dans le groupe de la pelvimétrie par tomodensitométrie, 51,0% ont accouché par césarienne. 28,0% ont eu une césarienne électorale du fait d'un bassin rétréci sur la base des résultats de la pelvimétrie par tomodensitométrie et 23% ont eu une césarienne d'urgence après une épreuve du travail. Dans le groupe témoin, 21,8% ont eu une césarienne d'urgence. Les différences du poids de naissance et de l'indice d'Apgar n'étaient pas significatives sur le plan statistique. La pelvimétrie par tomodensitométrie a augmenté le taux de césarienne, laissant penser que la pelvimétrie par tomodensitométrie avant un accouchement vaginal et après une césarienne précédente a une utilité limitée.

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Introduction

Although the benefit of pelvimetry in predicting the outcome of labour in cephalic presentation is controversial, a recent survey in the United Kingdom revealed that radiological pelvimetry is still commonly used to predict the outcome of labour [1-4]. Both Krishnamurthy et al. [5], in a retrospective study in 1991, and Thubisi et al. [6], in a prospective randomized study in 1993, reported that X-ray pelvimetry in women with one previous caesarean section increased the rate of subsequent delivery by caesarean section and was a poor predictor of the outcome of labour.

However technological advances mean that computed tomography (CT) and magnetic resonance imaging (MRI) are now simpler and more reliable and accurate, with reduced levels of ionizing radiation or no ionizing radiation [7]. These features have caused a resurgence in pelvimetry [8]. In our hospital, based on published data, some staff advocate the use of low-dose CT pelvimetry to assess pelvic adequacy before allowing vaginal birth after caesarean (VBAC) delivery.

The objective of our study was to determine the impact of low-dose CT pelvimetry in women with a previous caesarean section who fulfilled the criteria for VBAC.

Patients and methods

Between January 1995 and December 1997, the hospital records of all pregnant women with one previous caesarean section, attending the antenatal clinic at the Prince Hashim Hospital, Zarqa, Jordan, were examined. Criteria for inclusion in the study were:

- request by the patient for VBAC

- single pregnancy with cephalic presentation
- estimated fetal weight less than 4 kg
- no medical or obstetrical contraindications (e.g. diabetes mellitus, history of classical or inverted T-incision or presence of placenta praevia).

Of the 219 women who fulfilled the criteria, 100 had antenatal low-dose CT pelvimetry for assessment of the pelvis before VBAC (based upon the practice of a number of the hospital's consultant obstetricians), while 119 did not and they served as the control group.

CT pelvimetry was performed using the low-dose technique used by Federle et al. [9] and modified by Akeil et al. [10]. A Siemens Somatom DR3 CT scanner was used.

An anteroposterior scout view measured the transverse diameter of the pelvis. Women who had CT pelvimetry were categorized as those with an adequate pelvis and those with an inadequate pelvis. Based on published data, an adequate pelvis was defined as a pelvis with anteroposterior and transverse diameters of the inlet of 11 cm and 12 cm respectively, an anteroposterior diameter of the outlet of 11 cm and an interspinous diameter of 10.5 cm [10,11]. An inadequate pelvis was defined as a pelvis with an anteroposterior diameter of the inlet of less than 11 cm, and/or an interspinous diameter of less than 10 cm.

Those women with an inadequate pelvis, based upon the findings of CT pelvimetry, gave birth by elective caesarean section. Those women with an adequate pelvis, as well as the control group, undertook VBAC.

Labour and delivery were managed by the registrar-on-call, who was aware of the planned management. Intramuscular analgesics (pethidine and phenergan) were

used for pain relief. All the women had continuous electronic fetal heart monitoring.

Oxytocin augmentation was used in cases of dysfunctional labour at a starting dose of 1 mU/minute, increased by 1 mU/minute every 30 minutes until three uterine contractions were noted in a 10-minute period. Emergency caesarean section was performed where indicated.

Results

There were no significant differences in maternal characteristics between those women who had antenatal CT pelvimetry and those who did not (Table 1). We found a statistically significant difference in the rate of caesarean section between the two groups ($P = 0.02$). Fifty-one women (51.0%) in the CT pelvimetry group delivered by caesarean section. Twenty-three women (23.0%) underwent elective caesarean section for contracted pelvis based upon the findings of CT pelvimetry and 28 women (28.0%) underwent emergency caesarean section after a trial labour. In the control group 26 women (21.8%) underwent emergency caesarean section. However, only 49 women (49.0%) who had CT pelvimetry had vaginal deliveries, com-

pared with 93 women (78.2%) in the control group ($P = 0.02$). Six women (6.0%) in the CT pelvimetry group and three (2.5%) in the control group underwent induction of labour with prostaglandins (prostin 2.5 mg intravaginal suppository). Unfortunately, the small number of these patients excludes any useful comparison.

Interestingly, the duration of labour in those who delivered vaginally was shorter in the CT pelvimetry group (5.7 ± 4.6 hours) than in the control group (7.5 ± 4.9 hours) ($P = 0.01$). There was no significant difference between the groups in the mean birth weight and Apgar scores of the babies. There was no perinatal or maternal mortality. Those women who delivered vaginally in the CT pelvimetry group were discharged home earlier than those who underwent caesarean section.

Discussion

Federle et al. popularized the low-dose CT pelvimetry technique in 1982 [9]. It involves two low-dose digital radiographs generated on a CT scanner and one CT section. The absorbed dose from the CT section is 380 mrad. The reliability and reproducibility of the technique, as well as further reductions in the dose of radiation, have been corroborated by other independent studies [12,13]. A recent committee opinion of the American College of Obstetricians and Gynecologists defines low-dose CT pelvimetry as 250 mrad [14].

The advantages of CT pelvimetry are a different issue from its clinical usefulness as a diagnostic test. Earlier studies suggested that X-ray pelvimetry as an aid to decision-making was of limited value [2-4]. In 1991, Krishnamurthy et al. reported that 66% of women with one previous caesarean section and an inadequate pelvis, as

Table 1 Maternal characteristics

Variable	Study group (n = 100)	Control group (n = 119)
Age (years)	28.0 ± 5.1	28.9 ± 5.2
Parity	2.9 ± 2.0	2.7 ± 2.2
Height (cm)	126.0 ± 58.2	128.5 ± 56.9
Weight (kg)	63.2 ± 22.5	62.4 ± 23.7

Data are presented as mean ± standard deviation. The differences between the two groups were not statistically significant.

judged by X-ray pelvimetry, delivered vaginally [5]. Subsequently, in 1993, Thubisi et al. randomized women with one previous caesarean section into two groups; one group (144 women) had antepartum X-ray pelvimetry at 36 weeks of gestation, while the other group (144 women) had a trial labour without antepartum X-ray pelvimetry prior to delivery. In the antepartum X-ray pelvimetry group, only 23 women (16%) delivered vaginally compared with 60 women (42%) in the control group [6]. In our study, which included all pregnant women with one previous caesarean section who were eligible for VBAC, the success rate of VBAC in the CT pelvimetry group was 49.0%, while it was 78.2% in the control group. The increased rate of caesarean section in the CT pelvimetry group was not associated with an improvement in the immediate neonatal outcome.

Furthermore, 36.0% of the women judged by CT pelvimetry to have an adequate pelvis failed to deliver vaginally.

Vaginal birth after caesarean delivery is safe. Worldwide, the success rate of VBAC varies from 60% to 80% and the risk of rupture with a previous low transverse incision is well below 0.5% [15]. Some may argue that CT pelvimetry is helpful for women who have had a previous caesarean section for cephalic disproportion. However, this is a relative rather than absolute diagnosis. It has also been reported that the 60%–80% success rate of VBAC is unrelated to the reason for the previous caesarean section [16]. Our study showed that CT pelvimetry increased the rate of caesarean delivery. Therefore, documenting the adequacy of the pelvis by CT pelvimetry before VBAC is a procedure of limited value.

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Announcement

World Health Organization seeks to strengthen its emergency roster

In order to strengthen its readiness for emergencies, the Department of Emergency and Humanitarian Action (EHA) of the World Health Organization (WHO) is searching for public health professionals who would be available at short notice for short and/or long-term assignments. WHO's goal is to reduce avoidable loss of life, burden of disease and disability in emergencies and post-crisis transition. WHO is mandated to establish standards for best practice in international health based on reviews of experience and analysis of available evidence, and to disseminate these to governments and other partners.

The potential candidates should have a health or social science background with a master's degree in public health or equivalent postgraduate degree. Candidates should have at least five years of international experience working in emergency situations. Excellent English or French with a good working knowledge of the other language is a requirement. Any additional language skills are an asset. We regret that we will not be able to reply to individual e-mails. All candidates with the above qualifications will be put on a roster of the Department of Emergency and Humanitarian Action (EHA). Application from disaster-prone countries and countries that have experienced crisis or are in crisis are especially welcomed. Applications from women are encouraged.

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