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Review Article

The relation between obstetric conjugate diameter during pregnancy and the type of delivery: a narrative review

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ABSTRACT

Obstetric conjugate diameter is the first point of the maternal pelvis through which the head of the fetus has to pass during the stages of birth and it is the most important female pelvimetry during pregnancy. This review aims to find out the relation between obstetric conjugate diameter measured by radiography during pregnancy and the type of birth, vaginally, or by caesarean. Narrative review conducted at Najran Medicine College (Kingdom of Saudi Arabia). METHODS: Articles review describing the association between obstetric conjugate diameters measured by radiography during the last stage of pregnancy and type of delivery were selected from the electronic database (PubMed, LILACS, SciELO, and Google scholar). The search date was on January to February 2023. This review showed that there is a relationship between obstetric conjugate diameter and the type of delivery and can be used in predicting the mode of birth (vaginal or cesarean). This knowledge is important for obstetricians and gynecologists to predict the type of childbirth, vaginally, or by cesarean.

Keywords: Obstetrics, Conjugate, Diameter, Vaginal delivery, Cesarean

INTRODUCTION

In recent decades, the cesarean section rates have increased around the world. According to the latest data collected from 150 countries showed that 18.6% of all births occur by cesarean section. Latin America and the Caribbean region has the highest cesarean rates (40.5%), followed by Northern America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%), and Africa (7.3%).[1] The health world organization estimated that the global unnecessary cesarean section reaches about 6.20 million and its costs to approximately 2.32 billion dollars per year.[2] Analysis of global observation showed that there are proportions between cesarean section rates and maternal, infant, and neonatal mortality.[3] The obstetric intervention is necessary to reduce the side effect comes from cesarean section such as the increased risk of placenta previa, hysterectomy, and surgeons wound infections.[4-6] The obstetric conjugate diameter is defined as the distance between the sacral promontory and the inner midpoint of the symphysis pubis (Figures 1, 2); otherwise, it's the first area in which the head of the fetus had passed during the first stage of delivery.[7-12] During pregnancy, the obstetric conjugate diameter is mainly measured by radiography such as X-rays, ultrasound, computed tomography (CT), stereo radiographic imaging, and magnetic resonance.[7-10] This review provides a summary of the relation between obstetric conjugate diameter measured by radiography during pregnancy and the type of birth (vaginal delivery or cesarean).

METHODS

A narrative review of the literature was managed, using PubMed, SciELO, LILACS, and Google scholar databases to obtained relevant articles describing the relation between obstetric conjugate diameters measured by radiography during pregnancy and the type of birth.

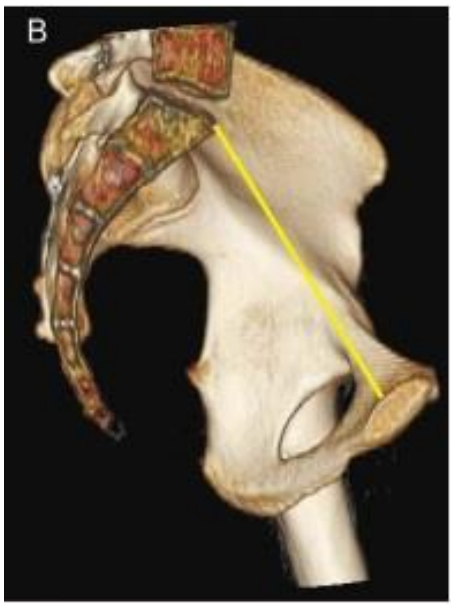

Figure 1: Images of the pelvis by three-dimensional reconstruction of a computed tomography scan where the measurement technique obstetric conjugate diameter (B) is observed.[11]

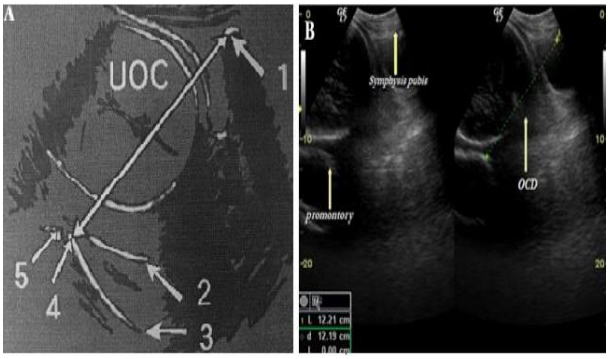

Figure 2: A (sonographic) and B (Ultrasound) pictures showing the measure of obstetric conjugate diameter (OCD). (1: Pubic bone, 4: sacral Promontory, 5).[12]

The search date was on January to February 2023. The English terms used in the search were “Obstetric conjugate diameter” and “vaginal delivery or cesarean delivery". The keywords used in the search included "Conjugate", “Diameter”, or “Vaginal delivery”, “conjugate diameter and vaginal delivery” and “conjugate diameter and cesarean delivery”. The scientific articles concerning the relationship between obstetric conjugate diameter measured by radiography during pregnancy and the type of birth, vaginally or by cesarean were selected and inspected by the author. The articles that were duplicated and also that contain information about other risk factors (used in predication the type of birth) such as fetal weight, fetal head size, and the mother's previous problems were excluded. The search strategy for each database and the number of articles obtained from each database were shown in Table 1.

Table 1: The search strategy for each database and the number of articles obtained from each database.

Data base	Search strategy	Number of articles
PubMed	Obstetrics or obstetric conjugate diameter during vaginal and cesarean deliveries, women pelvimetry related to age, Obstetrics conjugate diameter during natural childbirth or cesarean	21
LILACS	Obstetrics conjugate diameter during cesarean and vaginal deliveries, conjugate diameter and natural childbirth or cesarean	1
SciELO	obstetric conjugate diameter and vaginal deliveries, pelvimetry during cesarean and natural childbirth, , women conjugate diameter related to age	1
Google scholar	Obstetric conjugate diameter during vaginal delivery or cesarean, obstetrics conjugate diameter during natural childbirth and cesarean, women pelvimetry related to the age.	8

I considered these bases in my selection: (a) the articles contain relation between obstetrics conjugate diameters measured by radiography during pregnancy and type of delivery, vaginally or by cesarean, and (b) English is the specified language for the articles. 15 articles related to our narrative review were selected and classified according to the relations between obstetric conjugate diameter measurement for women who delivered vaginally and by cesarean.

RESULTS

A search in PubMed, SciELO, LILACS, and Google scholar databases showed 22 articles extracted and included in this narrative review. 15 articles containing information about obstetric conjugate diameter measurement by radiographic methods used in predication the mode of delivery for pregnant women. The obstetrician and gynecologist mainly used X-rays, ultrasound, computed tomography (CT) and stereo radiographic imaging (SRI), and magnetic resonance images to measuring the obstetric conjugate diameters.[7-10]

The obstetric conjugate diameter measured by ultrasonography was performed in 200 pregnant Iranian

women during 25-35 weeks, the obstetric conjugate diameter in group V (vaginal delivery), and C (cesarean delivery) was 125.51±8.35 mm and 112.99±8.53 mm respectively.[12] Magnetic resonance imaging was applied to 38 American pregnant women for predicting the mode of delivery (vaginal or cesarean) and showed that the obstetric conjugate diameter was 10.8±0.9 cm in women who delivered by cesarean and was 11.8±07 for women who delivered vaginally.[13] A computed tomography was conducted on 175 Korean women's (age ranged from 20 and 50 years) to predict the type of delivery (vaginal or cesarean), therefore, they observed that 84 women gave birth by normal vaginal delivery and their mean obstetric conjugate diameter was 119.6±9.5 mm, while 20 women were delivered by cesarean section was116.6±8.4 mm.[14] The obstetrical conjugate diameter was determined by a caliper in 114 Ghanaian women and presented that the obstetric conjugate diameter for women who delivered vaginally was 10.61±0.81 cm and those patients underwent cesarean section was 9.54±0.63 cm.[15] X-ray pelvimetry was performed on 391 Hon Kong women at 36 weeks pregnancy, 371 women were successfully vaginal delivery and their mean obstetric conjugate diameter was 11.67±0.79 cm, while 74 women were failed vaginal delivery was 11.46±0.72 cm.[16] Fifty-five pregnant women from Delhi were admitted for induction of labor, and ultrasonic pelvimetry was conducted for each woman to know the mode of delivery before birth and showed that obstetric conjugate diameter was less than 10 cm for a possibility of cesarean delivery.[17] A computed tomography pelvimetry was applied for Turkish pregnant women to assess the mode of childbirth and showed that the women who delivered vaginally have an obstetric conjugate diameter of more than 10.5 cm.[18] Magnetic resonance pelvimetric data were reviewed in 781 Switzerland women for the purpose to find the type of delivery (vaginal or cesarean) and the mean obstetric conjugate diameter was 121.7±8.6 mm in the group undergone vaginal delivery, whereas for those delivered by cesarean was less.[19] In the previous study on Indian pregnant women, ultrasonic tomography pelvimetry was conducted and showed that the obstetric conjugate diameter measured less than 10 cm was associated with a 100% cesarean section, 10 cm to 10.9 cm was associated with 39.7% cesarean section, 11 cm to 11.9 cm was associated with 18.9% cesarean section, more than or equal to 12 cm was associated with 10% cesarean section.[20] A recorded study showed the mean obstetric conjugate diameter for Chinese pregnant women who underwent normal vaginal delivery was126.9±8.3 mm.[21] In the past research finding, the obstetric conjugate diameter was 11.42±1.5 cm for the women who get normal vaginal delivery while for those who get cesarean was 10.77±1.5 cm.[22]

DISCUSSION

Magnetic resonance imaging, computed tomography, ultrasonography, and X-ray are successfully used in the measurement of obstetric conjugate diameter during the last stage of pregnancy to predict whether the type of birth is vaginal or cesarean. This review showed that an increase in obstetric conjugate diameter for pregnant women is significantly associated with an increasing rate of successful vaginal delivery and decreasing in obstetric conjugate diameter is significantly associated with an increasing rate of cesarean delivery.

According to this literature review, we observed that the obstetric conjugate diameter was variable among pregnant women. The mean obstetric conjugate diameter was significantly less in the women who delivered by cesarean than those who were delivered vaginally. These previous studies are supported our finding as follows: for 200 Indian pregnancy, the mean obstetric conjugate diameter was 125.51±8.35 mm for women who delivered vaginally while those who delivered by cesarean was112.99±8.53 mm, for the 38 American pregnant women, the obstetric conjugate diameter was 10.8±0.9 cm in women who delivered by cesarean and was 11.8±07 in women who delivered vaginally.[12,13] For Korean women, the mean obstetric conjugate diameter was 119.6±9.5 mm for those who delivered vaginally, while was 116.6±8.4 mm for those who underwent cesarean section, for 114 Ghanaian women, the mean obstetric conjugate diameter in women who delivered vaginally was 10.61±0.81 cm and those patients underwent cesarean section was 9.54±0.63 cm, and for 391 Hon Kong, the mean obstetric conjugate diameter was 11.67±0.79 for those who delivered vaginally and it was 11.46±0.72 cm for those who underwent by cesarean.[14-16] Therefore, in women with an obstetric conjugate diameter smaller than 10 cm, the necessity could be predicted strongly. In the previous study on Indian pregnant women, ultrasonic tomography pelvimetry was showed that the obstetric conjugate diameter measured less than 10 cm was associated with a 100% cesarean section, 10 cm to 10.9 cm was associated with 39.7% cesarean section, 11 cm to 11.9 cm was associated with 18.9% cesarean section, more than or equal to 12 cm was associated with 10% cesarean section.[20]

CONCLUSION

This written review concluded that the obstetric conjugate diameter measured during the last stage of pregnancy is successful in predicting the type of birth (vaginally or cesarean) if there are no other risk factors for the fetus or mother. Increasing obstetric conjugate diameter can give a prediction for vaginal delivery while a decrease in obstetric conjugate diameter can give a prediction for cesarean section. The cesarean section for pregnant women could be predicted strongly when the obstetric conjugate diameter measured less than 10 cm. This knowledge's in this review is useful for gynecologists and obstetricians and can be used for predication the type of birth.

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