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Determining the Incidence of Gynecoid Pelvis Using Three-Dimensional Computed Tomography in Nonpregnant Multiparous Women

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Key Words
Three-dimensional computed tomography · Cephalopelvic disproportion · Labor dystocia · Pelvic type · Gynecoid pelvis · Android pelvis · Anthropoid pelvis · Platypelloid pelvis · Multiparous women

Abstract
Objectives: To determine the incidence of gynecoid pelvis by using classical criteria and measured parameters obtained from three-dimensional computed tomography (3D CT) pelvimetry in nonpregnant multiparous women who delivered vaginally. ***Subjects and Methods:*** Our hospital's picture archiving and communication system was reviewed retrospectively. All adult women who had undergone CT examination with routine abdominal protocols were identified. In the pelvic inlet, midpelvis, and pelvic outlet, classical criteria and measured parameters, both alone and in combination, were used to determine the presence of gynecoid pelvis. ***Results:*** 3D CT pelvimetry was performed on 226 women aged 23–65 years without any history of cephalopelvic disproportion and who had at least one delivery of an average fetal size (>2,500 g). The median parity was 4, and the mean (±SD) birth weight was 3,700 ± 498 g. Compared to the classical criteria, measured parameters and their combined use with the classical criteria significantly reduced the frequency of gynecoid pelvis (51.3 and 47.8%, respectively, vs. 71.6%; $p = 0.001$); however, there was no significant difference between the measured parameters and their combined use with classical criteria with regard to the frequencies of gynecoid pelvis ($p > 0.05$). ***Conclusions:*** With the use of measured parameters of 3D CT pelvimetry, the incidence of gynecoid pelvis reduces to a more acceptable level (51.3%) in accordance with obstetric knowledge. Since there is no considerable decrease with the addition of classical criteria, 3D CT pelvimetry alone has merit for determining a woman's pelvic capacity for obstetric needs after the improvement and standardization of measured parameters.

Introduction

The preference for Cesarean section as a delivery method is high in many countries, and Cesarean rates are increasing at a higher than acceptable rate in all developed and many developing countries [1, 2]. Reportedly, approximately a third of women in many developed countries give birth through Cesarean delivery [1]. As stated in the position paper Safe Prevention of the Pri-

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mary Cesarean Delivery released in 2014, the most frequent indication for primary Cesarean delivery is labor dystocia [2, 3]. Among all Cesarean deliveries, previous Cesarean delivery and labor dystocia are the leading indications for performing this procedure [4].

It is our contention that in order to reduce the number of Cesarean deliveries without increasing perinatal morbidity or mortality, labor dystocia or abnormally slow progress in labor needs to be redefined. Recently, it has been shown that the average labor process progresses more slowly than is defined in obstetric sources [2]. In addition, labor dystocia can, in order of decreasing frequency, result from cephalopelvic disproportion (CPD), abnormal fetal presentation, or uterine dysfunction. CPD refers to the mismatch between the size of the fetal presenting part and the maternal pelvis, resulting in the labor process 'failure to progress' for mechanical reasons in the presence of adequate uterine activity [5]. Although several factors have increased the rate of CPD, with an average-sized fetus, inadequate maternal pelvis is the leading cause [6].

To decrease Cesarean delivery rates to within an acceptable range, sound obstetric judgment based on adequate knowledge of the normal parameters of the maternal pelvis is needed. This is especially true of the pelvic type, as it intimately affects the process of labor. Although pelvises can be classified according to diameter, in obstetric practice they are often divided into 4 main types: gynecoid, android, anthropoid, and platypelloid, based mainly on the shape of the pelvic inlet [5].

Overall, the course and outcome of labor depend on both the actual pelvic type and its diameter. In recent years, emphasis has been placed on the use of advanced radiological technology for the assessment of the maternal pelvis. These technologies include computed tomography (CT), magnetic resonance imaging (MRI), and ultrasonography (US) [5]. MRI has the advantage of providing accurate pelvimetry on cross-sectional images without emitting ionizing radiation to the mother and fetus. However, the latest advancements in spiral data acquisition using three-dimensional (3D) volume-rendering techniques, and possible low-dose settings with fast-scanning CT, could potentially obtain a more precise measurement of pelvic dimensions and provide good quality images of the bony pelvis [6].

To the best of our knowledge, no study has been conducted of 3D CT pelvimetry combined with obstetric pelvimetry to determine the incidence of gynecoid pelvis. In obstetric practice, we believe a thorough knowledge of the pelvic landmarks and their spatial relationships is mandatory for determining pelvic type, as it could contribute to the prediction of CPD before and during the labor process.

This study was undertaken to assess the incidence of gynecoid pelvis by using classical criteria and measured parameters obtained by 3D CT pelvimetry in nonpregnant multiparous women who delivered vaginally. In addition, it also sought to determine the contribution made by the measured parameters based on 3D CT pelvimetry for the prediction of gynecoid pelvis. To increase the reliability of the findings obtained from 3D CT pelvimetry in determining the presence of gynecoid pelvis for the prediction of CPD, we set out to evaluate the pelvises of women who had a previous delivery of an average fetal size (>2,500 g).

Subjects and Methods

CT Data

In this retrospective study, 3D CT pelvimetry was performed to assess pelvic types in nonpregnant multiparous women. In order to select eligible women, we screened the picture archiving and communication system of our university hospital for CT scans including the pelvic region. We selected cases where CT scan had been performed for the purpose of diagnosis of abdominal disorders. Women were eligible if they had at least one singleton term delivery with normal vertex presentation, a birth weight of >2,500 g, no maternal or pelvic complication, and no operative means. Exclusion criteria comprised a history of pelvic fracture, pelvic bone tumor, pelvic anomaly or operation, and a maternal height ≤150 cm. Women (n = 226) with complete clinical and radiological records were identified and included in the analysis. This study was approved by the university's Human Research Ethics Committee and conducted according to the committee's guidelines.

We used archived CT data of examinations performed under routine abdominal protocols that were carried out with a 128-slice multidetector CT scanner (Aquilion; Toshiba Medical Systems, Tokyo, Japan). Pelvic types were determined retrospectively by pelvimetry on a 3D workstation (Aquarius iNtuition edition, version 4.4.6; TeraRecon Inc., San Mateo, Calif., USA). For these reconstructions, we used multiplanar and volume-rendered images at 5-mm slice thickness reconstructed by one observer (I.S.). After standardizing image interpretation in a pilot study that evaluated pelvises and measured pelvic dimensions for a 2-week period, we intended to decrease the variability among the readers of pelvic CT scans and to prevent measurements from differing by >5%. The radiology investigator was blinded to the obstetric data of the subjects. Transverse diameters were obtained from the reformatted images of the pelvic planes, including those showing anteroposterior diameters in the midpelvis. Intraobserver variability was expressed as a κ coefficient that ranged from 0.82 to 0.88.

Determination of Pelvic Type

The true pelvis is situated below the pelvic brim and has obstetric importance. For the descriptive purpose of classifying pelvic types, it is divided into 4 imaginary planes at different levels: the

Table 1. Main characteristics of pelvic types [5, 11]

	Gynecoid	Android	Anthropoid	Platypelloid
Pelvic inlet	Slightly oval in TR axis	Heart shaped with anterior narrow apex	Oval in AP axis	Oval in TR axis
Midpelvis				
Cavity	Shallow	Funnel shaped and deep	Deep	Shallow
Sidewalls	Straight	Convergent	Divergent	Divergent
Ischial spines	Blunt	Projecting	Blunt	Blunt
Sacrum	Broad and well curved	Slightly curved	Long, narrow, and slightly curved	Slightly curved
Sacroischiatic notch	Wide	Narrow	Wide	Narrow
Pelvic outlet				
Subpubic arch	Optimal wide (90–100°)	Narrow (<90°)	Narrow (<90°)	Wide (>100°)

AP = Anteroposterior diameter; TR = transverse diameter.

pelvic inlet, the plane of greatest and least diameters, and the pelvic outlet.

The pelvic inlet is bounded by the linea terminalis. Anteroposterior diameters are the distance from the sacral promontory to the upper margin (true conjugate), a short distance from the upper margin (obstetric conjugate), and the lower (diagonal conjugate) margin of the symphysis pubis. The transverse diameter of the inlet is important for determining its inlet.

The plane of greatest diameter is the largest part of the pelvic cavity and is bordered by the posterior midpoint of the pubis anteriorly, the upper part of the obturator foramina laterally, and the junction of the second and third sacral vertebrae posteriorly. The anteroposterior diameter extends from the midpoint of the posterior surface of the pubis to the junction of the second and third sacral vertebrae. The transverse diameter is the widest distance between the lateral borders of the plane [5, 7, 8].

The plane of least diameter is delineated by the lower edge of the pubis anteriorly, the ischial spines laterally, and the lower sacrum posteriorly. The anteroposterior diameter extends from the lower border of the pubis to approximately the middle of the fourth sacral vertebra. The transverse diameter extends between the ischial spines.

The midpelvis, including the planes of greatest and least pelvic diameters, is bounded anteriorly by the posterior aspect of the symphysis pubis and posteriorly by segments of the sacrum at level S3 or S4. The pelvic side walls and ischial spines form the lateral boundaries of the midpelvis [9].

The pelvic outlet includes the anterior and posterior triangular planes with a common base at the level of the ischial tuberosities. The anterior plane is bordered by the pubic rami on the sides, the subpubic angle at the apex, and the intertuberous diameter at the base. The posterior plane is bordered by the sacrotuberous ligaments on the sides, the sacrococcygeal joint at its apex, and the intertuberous diameter at the base. The anteroposterior diameter extends from the lower margin of the symphysis to the sacrococcygeal joint instead of the tip of the coccyx. The intertuberous diameter of the outlet is measured from the inner borders of the ischial tuberosities.

The anterior and posterior sagittal diameters measure the distance from the midpoint of the transverse diameter to the points used in measuring the anteroposterior diameter. We measured the width and depth of the sacroischiatic notch and the width and height of the ischial spine to determine their shape.

Table 1 presents the 4 basic pelvic types as determined by the Caldwell-Moloy classification system: gynecoid, android, anthropoid, and platypelloid [5, 10]. Gynecoid pelvis is the classical female pelvic type; however, many female pelvises are a mixture of pelvic types. To make it easier to define pelvic type, the pelvis was defined according to its posterior characteristics, taking into account its anterior characteristics if present [5]. In addition to the parameters set forth in table 1, we used cutoff values for pelvimetric measurements included in textbooks related to childbirth, such as those for pelvic inlet, midpelvis, and pelvic outlet [7, 8, 11, 12].

With the help of the classical criteria listed in table 1, the gynecoid pelvis was diagnosed if all the 7 criteria were positive in a study subject. The gynecoid pelvis was defined if all the 12 measured parameters were positive in the following: pelvic inlet (obstetric conjugate >10.5 cm, transverse diameter >13 cm, and posterior sagittal diameter >4.5 cm), midpelvis (plane of greatest diameter: anteroposterior diameter >12.5 cm, transverse diameter >12.5 cm, and posterior sagittal diameter >4.5 cm, plane of least diameter: anteroposterior diameter >12 cm, interspinous diameter >10.5 cm, and posterior sagittal diameter >4.5 cm), and outlet (anteroposterior diameter >11 cm, intertuberous diameter >11 cm, and posterior sagittal diameter >4 cm). For the determination of gynecoid pelvis according to the classical criteria and measured parameters together, the diagnosis of gynecoid pelvis required the positivity of gynecoid pelvis according to both the classical criteria and measured parameters.

Statistical Analysis

We recorded CT data related to pelvic size and type along with selected maternal data, including age, parity, height, weight, and maximum birth weight (3D CT data were not adjusted for maternal data). Maximum birth weight was defined as the largest birth weight of all newborns. Data analysis was performed using commercially available statistical software (IBM SPSS Statistics version 22; IBM, Chicago, Ill., USA). Variables were expressed as means ± SD (with a range or percentage, as appropriate). The frequencies of gynecoid pelvis according to the classical criteria and measured parameters, both alone and in combination, were compared with the χ^2 test. A p value of <0.05 was accepted as significant.

Results

Selected demographic and clinical parameters of the study population are presented in table 2. Within the study population, maternal age ranged from 23 to 65 years, parity ranged from 1 to 13, maternal height ranged from 140 to 175 cm, maternal weight ranged from 43 to 115 kg, and maximum birth weight ranged from 2,500 to 5,200 g.

Table 3 shows the frequency of the classical parameters used to assess gynecoid pelvis in nonpregnant multiparous women who delivered vaginally. Overall, the study population had a higher percentage (82.7–100%) of characteristics of gynecoid pelvis. The frequency (85.3–100%) of midpelvic characteristics highly correlated with those of the pelvic inlet and outlet. In addition, the frequency (98.6%) of outlet characteristics considerably matched those of the pelvic inlet and the midpelvis. When considered in combination, the inlet-plus-midpelvis and the inlet-plus-midpelvis-plus-outlet criteria provided ratios of 76.9 and 71.6%, respectively, for predicting gynecoid pelvis.

The frequencies of the measured parameters used to predict the presence of gynecoid pelvis in the pelvic inlet and plain of least diameter and outlet were found to be considerably similar in combination according to the pelvic planes; however, these frequencies were higher than that of the plane of greatest diameter (62.8, 67.6, and 65.9 vs. 56.6%; table 4). After conducting combined analyses of these frequencies, the inlet-plus-plane-of-least-diameter and the inlet-plus-plane-of-least-diameter-plus-outlet criteria provided similar ratios (54.4 and 51.3%, respectively), although they were lower than those of the pelvic inlet, the plane of greatest diameter, and the outlet alone. Considering the frequencies of gynecoid pelvis according to the combined classical and measured parameters, overall, the number of women with gynecoid pelvis decreased to 108 (47.8%). The frequencies of gynecoid pelvis according to the measured parameters and the combination of classical criteria and measured parameters were significantly lower than that according to the classical criteria (71.6 vs. 51.3 and 47.8%, respectively; p = 0.001). The frequencies of gynecoid pelvis according to the classical criteria and measured parameters were found to be comparable (p > 0.05). Figures 1 and 2 display the representative images of patients with gynecoid and nongynecoid pelvises, respectively.

Table 2. Selected demographic and clinical parameters of the study population

Parameters	Values
Age, years	49.9±9.8 (23–65)
Parity, median	4 (1–13)
Maternal height, cm	160.0±4.2 (156–175)
Maternal weight, kg	75.0±13.4 (46–110)
Maximum birth weight, g	3,700±498 (2,500–5,200)

Values are means ± SD unless otherwise indicated. Values in parentheses are ranges.

Discussion

The median parity of our study population was 4 (range 1–13), and the mean birth weight was 3,700 g (range 2,500–5,200). We believe that these findings enhance the reliability of our results. After considering the classical criteria and measured parameters used to assess gynecoid pelvis, the incidence of gynecoid pelvis was 71.6 and 51.3%, respectively. After assessment of the incidence of gynecoid pelvis according to both the classical and measured parameters, it was reduced to 47.8%. The use of measured parameters and their combined use with classical criteria considerably reduced the incidence of gynecoid pelvis. However, although there was a further decrease in the incidence of gynecoid pelvis (from 51.3 to 47.8%) with the combined use of classical criteria and measured parameters, this difference did not reached statistical significance. In a population of multiparous women, using 3D CT evaluation and pelvimetry, the incidence of gynecoid pelvis was found to accord with general obstetric knowledge related to pelvic types, although it was higher according to classical criteria.

The size and shape of the pelvic canal varies as seen on various planes, including the pelvic inlet, the planes of greatest and least diameter, and the pelvic outlet, all of which determine whether vaginal birth is possible. In this context, the Caldwell-Moloy classification system of pelvic types provides the standard for understanding the identifying features of the 4 basic pelvic types in women which are, in order of frequency, gynecoid (~50%), an-

Table 3. Frequency of classical parameters of gynecoid pelvis in nonpregnant multiparous women who delivered vaginally

Parameters	Characteristics	Present, n (%)	Absent, n (%)
Pelvic inlet			
Pelvic shape	Transverse and slightly oval	187 (82.7)	39 (17.3)
Midpelvis			
Cavity	Shallow	199 (88)	27 (12)
Side walls	Straight	226 (100)	0 (0)
Ischial spines	Blunt	219 (96.9)	7 (3.1)
Sacrum	Broad and well curved	193 (85.3)	33 (14.7)
Sacroischiatic notch	Wide	220 (97.2)	6 (2.8)
Pelvic outlet			
Subpubic angle	>90°	223 (98.6)	3 (1.4)
Combined[1]			
Inlet plus midpelvis		174 (76.9)	52 (23.1)
Inlet plus midpelvis plus outlet		162 (71.6)	64 (28.4)

[1] Including combined frequencies of parameters in pelvic inlet, midpelvis, and outlet.

Table 4. Frequency of measured findings used to assess gynecoid pelvis in nonpregnant multiparous women who delivered vaginally

Parameters/criteria	Present		Absent	
	n (%)	mean ± SD	n (%)	mean ± SD
Inlet	142 (62.8)		84 (37.2)	
Obstetric conjugate >10.5 cm		116.4±8.0		106.8±9.1
TR >13 cm		140.4±5.7		132.2±8.3
PostSag >4.5 cm		49.3±2.9		41.1±6.4
Midpelvis				
Plane of GD	128 (56.6)		98 (43.4)	
AP >12.5 cm		132.3±5.3		120.0±7.1
TR >12.5 cm		136.2±6.5		130.5±7.6
PostSag >4.5 cm		65.7±4.1		59.3±5.0
Plane of LD	153 (67.6)		73 (32.4)	
AP >12 cm		129.7±5.8		121.9±9.1
TR (interspinous) >10.5 cm		117.1±7.1		109.5±7.2
PostSag >4.5 cm		64.3±4.2		60.5±5.0
Outlet	149 (65.9)		77 (34.1)	
AP >11 cm		119.3±5.6		109.5±8.0
TR (intertuberous) >11 cm		121.4±6.0		116.1±8.4
PostSag >4 cm		58.5±3.6		52.2±4.7
Combined				
Inlet plus plane of LD	123 (54.4)		103 (45.6)	
Inlet plus plane of LD plus outlet	116 (51.3)		110 (48.7)	
Overall incidence of gynecoid pelvis after combined use of classical and measured parameters	108 (47.8)		118 (52.2)	

AP = Anteroposterior diameter; GD = greatest diameter; LD = least diameter; TR = transverse diameter; PostSag = posterior sagittal diameter.

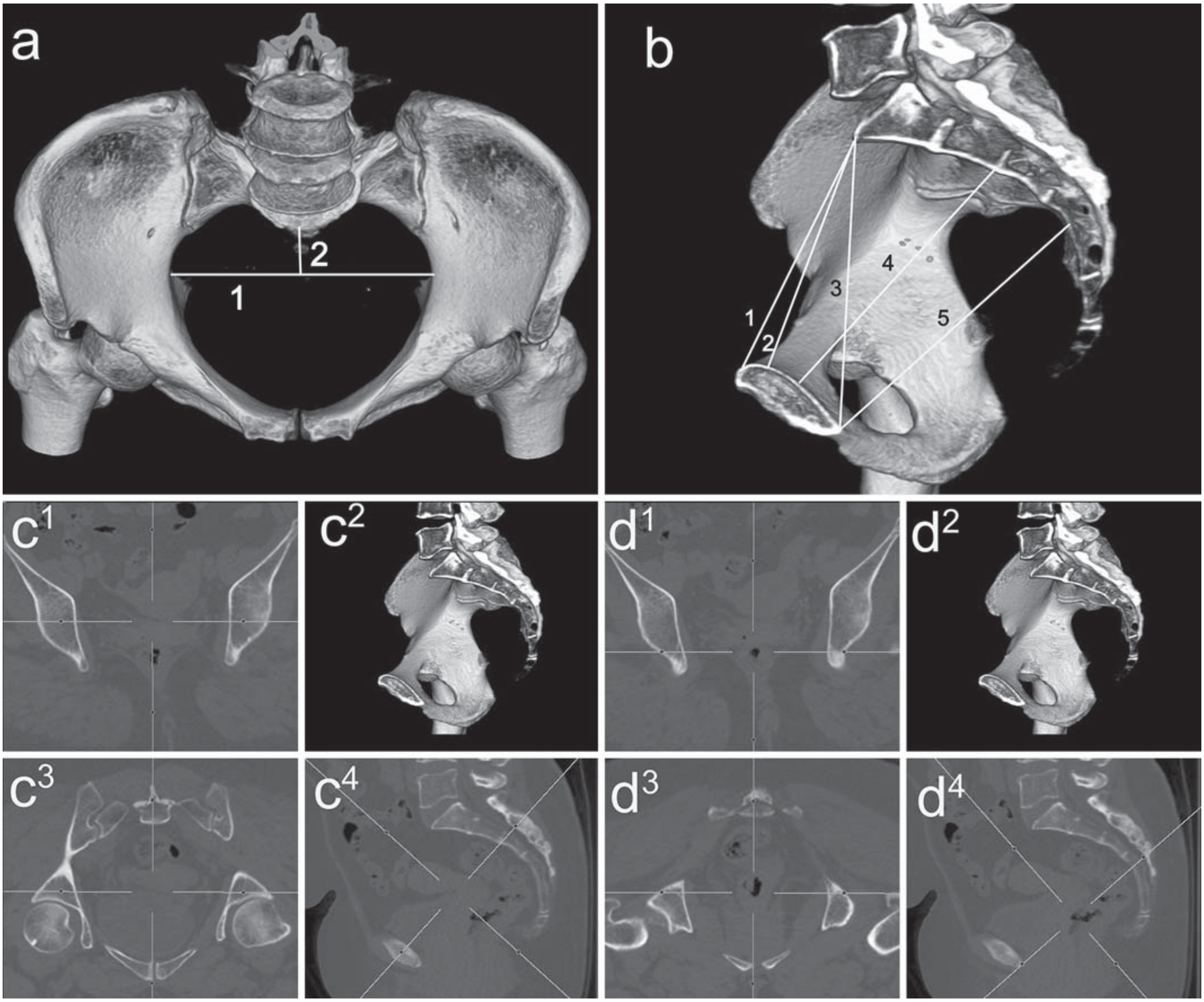

Fig. 1. Representative 3D and reformatted CT images of gynecoid pelvis (37-year-old woman, parity: 4). **a** Measurements of transverse (1; 140.1 mm) and posterior sagittal (2; 49.4 mm) diameters of the pelvic inlet. **b** Measurements of true (1; 118.6 mm), obstetric (2; 116.2 mm), and diagonal conjugates (3; 122.6 mm) of the pelvic inlet and planes of greatest (4; 132.5 mm) and least (5; 129.6 mm) diameter of the pelvis. Measurement planes of greatest diameter (**c**[1]–**c**[4]) and least diameter (**d**[1]–**d**[4]) of the pelvis.

droid, anthropoid, and platypelloid. In addition to these types, at least 10 mixed forms consisting of combinations of anterior and posterior segments of the pure types of pelvises have been described. Because of its spacious inlet, large interspinous diameter, and wide subpubic arch, the gynecoid pelvis is the most suitable for vaginal birth [13]. In general, the gynecoid and anthropoid pelvises are acceptably favorable; however, the android and platypelloid are known to be suboptimal [5, 10, 14].

It is logical to mention the minimal specifications for a pelvis in relation to an average-sized fetus during labor. The pelvic inlet is usually considered to be contracted if it has an obstetric conjugate <10 cm or a transverse diameter <12 cm. Taken together, when they are smaller than average dystocia is more commonly encountered. The anteroposterior diameter of the midpelvis between the inferior aspect of the symphysis pubis and the sacral surface at the level of the ischial spines is ≥11.5. The midpelvis is considered contracted if the interspinous diameter

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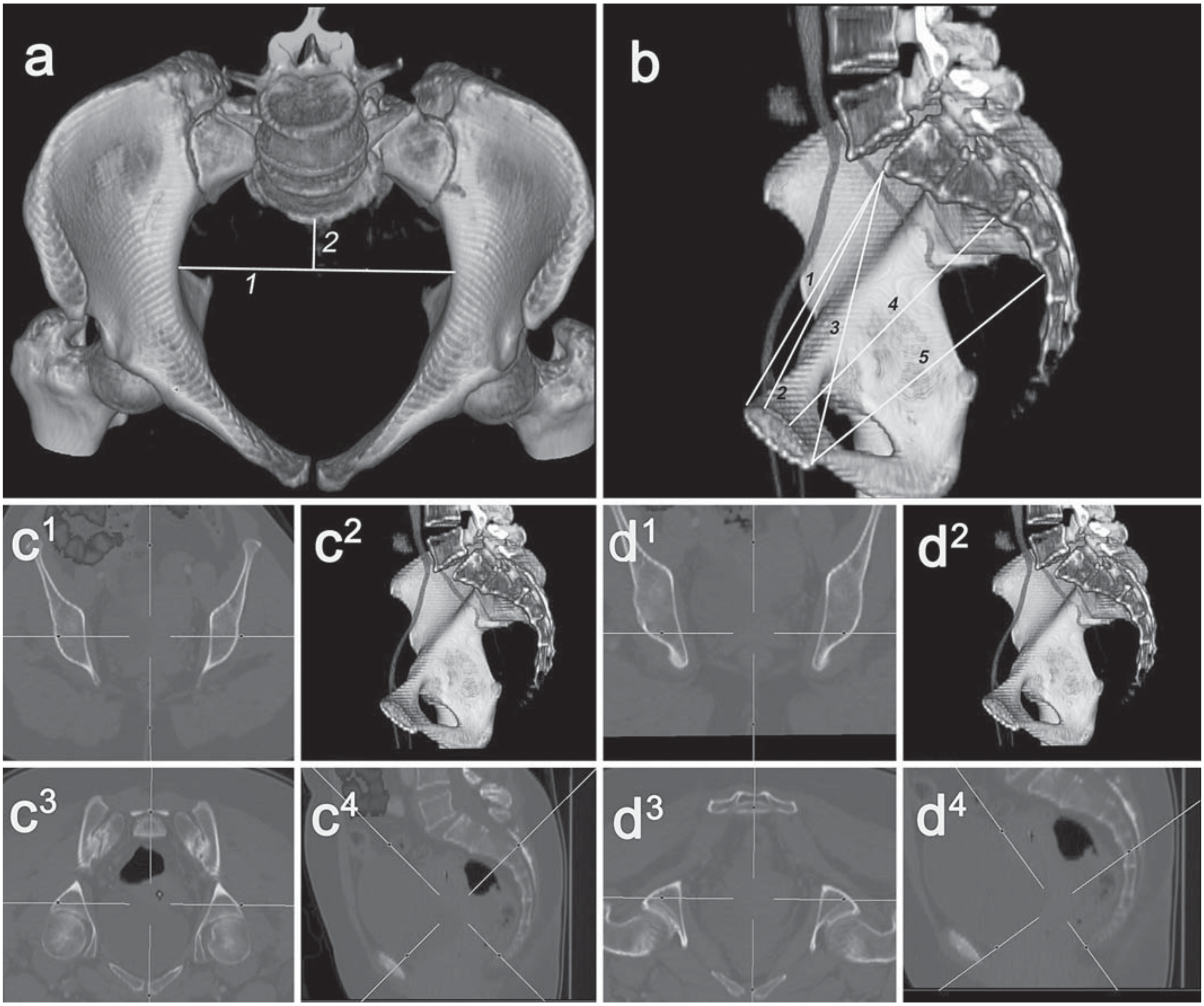

Fig. 2. Representative 3D and reformatted CT images of nongynecoid pelvis (29-year-old woman, parity: 2). **a** Measurements of transverse (1; 131.1 mm) and posterior sagittal (2; 40.8 mm) diameters of the pelvic inlet. **b** Measurements of true (1; 108.1 mm), obstetric (2; 105.9 mm), and diagonal conjugates (3; 118.3 mm) of the pelvic inlet and planes of greatest (4; 119.9 mm) and least (5; 121.1 mm) diameter of the pelvis. Measurement planes of greatest diameter (**c**^{1}–**c**^{4}) and least diameter (**d**^{1}–**d**^{4}) of the pelvis.

is <10 cm. Dystocia related to the midpelvis is more common than that related to the pelvic inlet; however, dystocia related to the pelvic outlet is rarely seen without midpelvic contraction [9]. As to the importance of this information in relation to the contracted pelvis, in the Caldwell-Moloy classification, the cavity, sidewalls, ischial spines, sacrum, and sacroischiatic notch were chosen as criteria for this pelvic type.

Variations in pelvic architecture must be carefully evaluated by the attending obstetric personnel. Clinical pelvimetry is performed to some extent as part of labor care, from admission to the labor unit until the delivery of the fetus, and the clinical impression of adequacy is noted. Currently, it is the only routine evaluation method during labor to assess the adequacy of the maternal pelvis. Nonetheless, a trial of labor in the normal course is still the method of choice for determining whether a given fetus will be able to pass through a given pelvis [8, 11, 15].

Since the pioneering Caldwell-Moloy classification system was established [5, 10], considerable research has been performed into pelvimetry by radiological means. A consensus has emerged that radiographic pelvimetry by means of radiography, CT, MRI, and US enables precise assessment of pelvic size and type; however, radiographic pelvimetry cannot reliably predict or diagnose CPD [5, 12, 16–19]. Considering the nature of labor and delivery, it would not be realistic to expect radiographic modalities alone to successfully predict all the cases of CPD. However, as imaging modalities advance and include new applications, the assessment of pelvic type for predicting CPD can be performed more accurately, thereby increasing the beneficial role of pelvimetry in obstetric care.

Harper et al. [20] conducted a study to assess the predictive role of X-ray pelvimetry using the Colcher-Sussman technique [21], considering the midpelvis for Cesarean delivery. This study measured the anteroposterior (situated between the symphysis pubis and vertebra S3) and transverse (interspinous) diameters and the circumference of the midpelvis. The authors noted that participants with an anteroposterior diameter or circumference ≤10th percentile were at increased risk of Cesarean delivery (risk ratio for anteroposterior diameter criterion: 4.8, 95% CI: 3.9–5.8; risk ratio for circumference ≤10th percentile: 3.8, 95% CI: 3.1–4.8). In that study, a transverse diameter ≤10th percentile was not associated with an increased risk of Cesarean delivery. The authors concluded that the anteroposterior diameter of the midpelvis was highly specific for requiring Cesarean delivery if the anteroposterior diameter was <9 cm. In a recent study [22], the value of the fetal-pelvic index for assessing CPD was evaluated in a prospective study that combined fetal biometry with US and pelvimetry with X-ray. The authors suggested that the fetal-pelvic index might be a useful adjunct in obstetric practice if it was combined with obstetric risk factors. In a previous study, the reliability of the fetal-pelvic index was confirmed as having high sensitivity and specificity ratios for determining the mode of delivery [23]. In some hospitals, CPD can be conflated with dystocia related to uterine activity, thus complicating the determination of the prevalence of true CPD [24].

In a Cochrane Review in 2000 [25], the authors concluded that there was no evidence to support X-ray pelvimetry if the fetus was in a cephalic presentation. They suggested that further research might need to be performed for selected cases, such as breech presentations. Although X-ray pelvimetry is capable of assessing only the bony pelvis, this is not a significant deficiency, since vaginal and US examinations during obstetric care can be helpful for diagnosing pelvic soft tissue abnormalities. In addition, as stated by Korhonen et al. [26], in the current era of CT and MRI, pelvic measurements can be performed in detail with the help of 3D images showing pelvic bony and soft tissue structures. These authors suggested that if pelvimetry and fetal biometry were performed in combination, their accuracy for predicting CPD could be increased considerably. Zaretsky et al. [16] performed MRI pelvimetry to predict CPD. They noted that MRI could identify those women at greatest risk for dystocia; however, its accuracy was not sufficient to be used in obstetric practice.

Our study has a limitation related to the cutoff values accepted as the criteria for gynecoid pelvis. Although these criteria were included in the obstetric and radiological textbooks, the techniques for measuring pelvic diameters need to be standardized according to the imaging capabilities of advanced CT and MRI. In addition, further studies are needed to determine pelvic diameter cutoff values according to pelvic planes.

Conclusion

3D CT pelvimetry has merit for determining a woman's pelvic capacity for obstetric needs after the improvement and standardization of the measured parameters. We believe that because the measured parameters can be used reliably and that classical parameters are evaluated somewhat subjectively, the assessment of pelvic types can be performed with the use of measured parameters without the use of classical criteria. Considering the findings of this study, the addition of measured parameters to the classical criteria decreases the rate of gynecoid pelvis from 71.6 to 47.8%, which is a more acceptable frequency of gynecoid pelvis as stated by obstetric knowledge. In an era of radiological imaging modalities with 3D capabilities, the specifications and methods for conducting pelvimetry by means of CT, MRI, radiography, and US need to be standardized in order to improve obstetric training and practice. Further studies of new applications using such radiological methods will make it possible to determine more objective, simple, and reliable criteria for diagnosing gynecoid pelvis.

Disclosure Statement

The authors have no conflicts of interest to report.

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