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ANATOMICAL PELVIC MEASURES IN RELATION TO SURGICAL TECHNIQUES THROUGH THE OBTURATOR FORAMEN

Hypothesis / aims of study

The development of new surgical techniques for the treatment of urinary incontinence and pelvic organ prolapse via a vaginal approach has bloomed in the recent years. Either the transobturator tension free vaginal tape (outside-in or inside-out) or meshes for the anterior compartment such as tension free vaginal mesh (Gynecare Prolift®, Ethicon Inc.) use the obturator foramen to enter the pelvic space. All surgical techniques are associated with a risk of a blind procedure, i.e. not guided by vision or directly by surgeons hand. This raises the interest for anatomical structures involved. The aim of this study was to describe the distances between the major bony, vascular, neurologic and visceral structures relevant to guide the path of trocar needles through the obturator foramen.

Study design, materials and methods

Anatomic dissection was performed in six embalmed female hemipelves of voluntary donors with special attention to the obturator foramen and neighbouring neurovascular structures. Anatomic distances were collected by an electronic slide gauge and stored in a data base. Distances studied are as follows: from ischiopubic ramus to ischial spine; from subpubic channel to ischial spine; arcus tendineus levator ani (ATLA) length, and from its anterior and posterior end points to the ischial spine; from ischiopubic ramus and ATLA to the pudendal nerve and vessels; from ischial spine to pudendal nerve and vessels; and diameters of the obturator foramen.

Results

The mean distances and standard deviation obtained are shown in the table. Distances are expressed in mm.

	MEAN	SD
A	68,19	2,03
B	64,54	2,54
C	50,46	6,06
D	57,14	4,82
E	60,87	5,61
F	65,44	3,07
G	17,13	2,02
H	79,06	4,31
I	75,91	7,17
J	64,93	8,86
K	67,31	5,21
L	75,57	6,01
M	23,19	1,57
N	79,35	4,13
O	73,89	7,32
P	62,29	9,78
Q	64,58	4,55
R	74,21	6,15
S	19,67	5,07
T	28,64	4,00
U	9,31	0,18
V	15,70	0,94
W	33,13	4,96
X	30,18	3,24
Y	31,02	3,84

A; superior 1/3 ischiopubic ramus to ischial spine
B; medium 1/3 ischiopubic ramus to ischial spine

C; inferior 1/3 ischiopubic ramus to ischial spine
D; Obturator canal (internum hole of the obturator conduct) to ischial spine
E; arcus tendineus levator ani (ATLA) length
F; anterior end of ATLA to ischial spine
G; posterior end of ATLA to ischial spine
H; superior 1/3 ischiopubic ramus to pudendal nerve
I; medium 1/3 ischiopubic ramus to pudendal nerve
J; inferior 1/3 ischiopubic ramous to pudendal nerve
K; Obturator canal to pudendal nerve
L; anterior end of ATLA to pudendal nerve
M; posterior end of ATLA to pudendal nerve
N, superior 1/3 ischiopubic ramus to internal pudendal artery
O; medium 1/3 ischiopubic ramus to internal pudendal artery
P; inferior 1/3 ischiopubic ramus to internal pudendal artery
Q; Obturator canal to internal pudendal artery
R; anterior end of ATLA to internal pudendal artery
S; posterior end of ATLA to internal pudendal artery
T; Ischiopubic ramus to obturator vessels and nerve
U; ischial spine to internal pudendal artery
V; ischial spine to pudendal nerve
W; longitudinal diameter of the obturator foramen
X; transversal diameter of the obturator foramen
Y; oblique diameter of the obturator foramen

Interpretation of results

Most new techniques for the treatment of stress urinary incontinence and pelvic organ prolapse with meshes use the ischiopubic ramus, the ischial spine and the arcus tendineus levator ani as guide points for the procedure. Distances from these structures to nerves and vessels is large enough to allow a safe procedure. However, attention must be driven to structures surrounding the ischial spine as long as pudendal nerve and vessels are only about 1 cm from the spine and risk of injury must be considered. Of interest, distances from the posterior end point of ATLA to pudendal nerve and vessels are about 2 cm. On the other side, obturator nerve and vessels are about 3 cm. from ischiopubic ramus, and thus quite far away from the needle passage. Finally, distances between ischiopubic ramus and the ischial spine or pudendal nerve and vessels are about 6 and 7 cm. respectively. Similarly, the total length of ATLA is about 6 cm. The knowledge of these distances may help us by limiting and excessive introduction of the needle, in a similar manner as the histerometer helps us to avoid an uterus perforation.

Concluding message

A good knowledge of anatomy brings light into the blind path for the passage of needles that use the obturator foramen as a route to enter the pelvic space . This must allow a safer surgical procedure, and a better understanding of potential risks, how to avoid them and the management of perioperative complications.

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