

AN ANATOMIC COMPARISON OF THE TRADITIONAL TVT-O VERSUS A MODIFIED TVT-O PROCEDURE.

Hypothesis / aims of study

A modification to the inside-out TVT-O procedure, decreasing both the amount of dissection required and the amount of mesh tape is described in this study. Our objective was to compare the impact of the modification on the relation of the tape to the obturator anatomy.

Study design, materials and methods

Five fresh frozen cadavers were operated upon to study the impact on the anatomical trajectory of using a reduced TVT-O tape procedure in comparison to the traditional TVT-O tape procedure. The TVT-O procedure was performed as originally described by the inventor.¹ The modified TVT-O and the traditional TVT-O procedures were performed in pairs with the exception of the first one, alternating the type of procedure between the right and left side on the same cadaver. A device specifically designed for this study was used: one side from the midpoint consisted of a traditional TVT-O device, whilst the other side was modified to include only 6 cm of mesh extended with a loop suture ("positioning sutures"). To assure that this modified study device actually represented a truly modified, shortened TVT-O procedure, the first cadaver was operated upon with a fully modified, shortened TVT-O tape. In contrast with the original procedure, the obturator membrane was not perforated, neither by the guide nor by the scissors, and the aim of the modified dissection was to obtain a channel with a minimal width of only 5 mm, sufficient to allow insertion of the winged guide. Consequently, as opposed to the original procedure, in the modified technique, the helical passer was the sole instrument to perforate the obturator membrane. The straight tip of the helical passer was inserted in the gutter of the winged guide and advanced until perforation of the obturator membrane. Similarly to the original procedure, the winged guide was subsequently removed and the helical passer was slowly rotated whilst bony contact with the inferior pubic ramus was maintained at all time during insertion, thus ensuring a tight passage around the bony structure, with the tip of the passer finally exiting at the skin level. The adjustment of tensioning prior to removal of the helical passer sheaths remained the same. To allow for this, positioning sutures were located at the end of the shortened tape. To facilitate centering of the shortened TVT-O tape, a "placement loop" in the centre of the tape was foreseen. Relevant distances between the tape and anatomical structures were recorded, as were the individual amounts of mesh in individual muscular structures.

Results

The modified tape traversed less muscular structures than the traditional tape, but consistently traversed the obturator membrane. The distance from the tape to the obturator canal measured on average 2.3cm vs 1.8cm, to the anterior obturator nerve 3.1cm for both, and to the posterior obturator nerve 2.2cm versus 2.1cm, in the modified versus the traditional tape, respectively. The amount of mesh left behind in the hemipelvis was 6.3cm in the modified versus 9.3cm in the traditional procedure. Individual results are presented in table 1.

Interpretation of results

One of the most striking observations in this study was the difference in the amount of tape left behind in the body by both procedures. In a bilateral procedure, on average, the tape would measure 12.8cm in the modified procedure and 18.6cm in the original technique. This translates into a reduction by one third of the length of the mesh inserted into the body. This anatomical study also showed that the shortened mesh was "anchored" in those critical tissue planes that can accomplish this, namely the internal and external obturator muscles in combination with the obturator membrane. In one cadaver, the tape perforated the obturator externus muscle for only 0.4cm. This underscores the accuracy required to position the shortened tape, aided by the placement of a loop to ensure symmetric tape placement. The total length of the modified tape (12cm) seemed sufficient to overarch the distance between both obturator membranes. The closest distance to the posterior obturator nerve was measured rather medially, approximately at the level where the tape traverses the obturator externus and, sometimes, a small portion of the adductor magnus muscle. This is the location where the modified tape ceases to exist. Consequently, the modified tape can theoretically no longer exert any local influence on the more lateral course of the posterior branches of the obturator nerve.

Concluding message

The modified tape traversed significantly less muscular structures than the traditional TVT-O technique, while still consistently anchoring in the obturator membrane at a similarly safe distance from the obturator canal. The modified tape reached equally close to the obturator nerves as in the traditional technique; however, the distance that the shortened tape's trajectory lied in proximity to the nerve branches is limited.

Table 1:

Record of mesh tape in individual muscles and subcutis and distances to nerve structures (in cm) comparing the TVT-O versus the modified TVT-O procedure (referred to as Mod(ified))

Cadaver	1		2		3		4		5		Mean		p
	Mod	Mod	Mod	TVTO	Mod	TVTO	Mod	TVTO	Mod	TVTO	Mod	TVTO	
Operated side	R	L	R	L	L	R	R	L	L	R			
Distance to Obturator Canal	3	2	2,50	2,50	2,00	1,50	2,00	1,50	2,00	1,70	2,25	1,80	NS

Closest distance to N. obturatorius posterior	2	2	3,00	3,00	1,80	1,80	2,00	1,60	2,30	2,00	2,18	2,10	NS
Closest distance to N. obturatorius anterior	-	-	3,00	3,00	3,1	3,80	2,50	2,30	3,50	3,40	3,03	3,13	NS
Perineal trajectory	4	4	3,30	3,30	4,40	4,70	4,00	4,00	4,80	4,00	4,08	4,00	NS
m. obturator internus	1	0,7	0,90	1,40	1,20	0,70	0,70	1,00	0,80	1,20	0,88	1,08	NS
m. obturator externus	1,1	1,4	1,20	1,10	0,40	1,10	1,50	2,00	1,00	1,00	1,10	1,30	NS
m. adductor longus	0	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NS
m. gracilis	0	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,40	0,00	0,4	NS
m. adductor magnus	0	0	1,10	1,20	0,00	1,10	0,30	1,60	0,00	1,60	0,23	1,38	S
m. adductor brevis	0	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NS
Subcutis	0	0	0,00	1,80	0,00	1,00	0,00	0,40	0,00	1,00	0,00	1,05	S
Tape mesh in hemipelvis	6,1	6,1	6,5	8,80	6	8,60	6,50	9,50	6,60	10,20	6,30	9,28	S
Exitpoint from thighfold	NR	NR	0,8	2	1,7	2,0	1,1	2,0	1,2	2,1	1,2	2,0	S

Mann Whitney U- test: S: Significant, NS: Not Significant; NR: Not recorded.

References

1. de Leval J. Novel surgical technique for the treatment of female stress urinary incontinence: transobturator vaginal tape inside-out. Eur Urol 2003; 44: 724-30.

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Is this a clinical trial?	No
What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	Yes
Specify Name of Ethics Committee	University of Liege
Was the Declaration of Helsinki followed?	Yes
Was informed consent obtained from the patients?	Yes