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DYNAMIC MRI CONFIRMS SUPPORT OF THE MID-URETHRA BY TVT AND TVT-O SURGERY FOR STRESS INCONTINENCE

Hypothesis / aims of study

The aim was to study changes in the behavior of the mid-urethra of stress urinary incontinent women undergoining either TVT or TVT-obturator sling operations by dynamic MRI.

Study design, materials and methods

In a prospective study forty-two parous women with stress urinary incontinence were recruited to dynamic MR imaging before and after a mid-urethral sling operation. Dynamic MR imaging was performed at rest, during pelvic floor muscle contraction, coughing and voiding with a bladder volume of 200 ml. X- and Y-co-ordinates were used to determine the location of the mid-urethra during these activities.

Results

The first twenty patients underwent a TVT operation and the subsequent twenty women a TVT-O operation. Two women were excluded because pre-operative MRI could not be performed due to claustrophobia. Four patients refused post-operative MR imaging. Ninety five percent (38/40) of the patients were cured by the operation having a negative cough stress test. The mean urinary incontinence severity score (UISS)[1] improved from 11.1(±4.1) to 1.4(±2.4) and the detrusor instability score (DIS)[2] score changed from 5.5(±2.0) to 3.1(±2.9), both changes were statistical significant p=0.001. No major intra or post-operative complications were detected.
Post-operatively the cured women could elevate their mid-urethra by pelvic floor muscle contraction significantly higher than before the operation (p=0.05). The mid-urethra was located higher post-operatively on the y co-ordinate (p=0.05) during straining, coughing and voiding (Table 1). The vector mobility during different functional manouvers were significantly restricted after mid-urethral sling operation.

Interpretation of results

Dynamic MRI confirms the support of the mid-urethra by TVT and TVT-O surgery for stress incontinence. Despite different support angels between the TVT and the TVT-O mid-urethral sling procedures, we could not see any difference in the movement patterns.

Concluding message The mid –urethral slings are supporting the mid-urethra and restricting the downward movement during different activities. The movement patterns were the same after the TVT- and TVT-O operations.

Table I
The X and Y co-ordinates to determine the middle point of the urethra before and after mid-urethral sling operation

	The x coordinate		**The y coordinate**	
	mean (mm)±sd	**sign.**	**mean(mm)± sd**	
rest				
preoperative	13.3 ± 3.4		-1.8 ± 4.7	
postoperative	13.0 ± 3.3	ns	-0.1 ± 4.7	<0.05
squeeze				
preoperative	14.5 ± 3.2		0.9 ± 5.1	
postoperative	14.3 ± 2.6	ns	2.7 ± 4.8	<0.05
straining				
preoperative	2.1 ± 4.6		-9.0 ± 5.1	
postoperative	5.4 ± 5.6	<0.05	-7.1 ± 4.9	<0.05
coughing				
preoperative	0.3 ± 4.0		-9.1 ± 5.6	
postoperative	3.6 ± 5.8	0.005	-8.0± 4.1	ns
voiding				

preoperative	-0.5± 6.5		-9.3 ± 4.0	
postoperative	4.1± 6.5	<0.001	-7.5± 4.3	0,001

Table II. The movement of the mid-urethra $\sqrt{(x_2-x_1)+ (y_2-y_1)}$

	before operation (mm)	after operation (mm)	sign
during pelvic floor contraction	4.8	3.6	0.3
straining	14.6	11.2	0.01
coughing	16.4	12.9	0.002
voiding	17.6	12.7	<0.001

X_2 X co-ordinate in different manouvers, X_1 X co-ordinate at rest, Y_2 Y co-ordinate in different manouvers

References

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2. Kauppila A, Alavaikko P and Kujansuu E. Detrusor instability score in the evalution of stress urinary incontinence. Acta Obstet Gynecol Scand1982; 61:137-41.

Specify source of funding or grant	**Pohjois-Savon Kulttuurirahasto, Finland**
Is this a clinical trial?	**Yes**
Is this study registered in a public clinical trials registry?	**Yes**
Specify Name of Public Registry, Registration Number	**NCT00747370**
Is this a Randomised Controlled Trial (RCT)?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**The Kuopio University Hospital Ethics Committee, Finland**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**