

Authors: G.A. Digesu*, L.Bombieri, V. Khullar*, A. Hutchings*, L Selvaggi*, R. Freeman
Institution: *Urogynaecology Unit, St Mary's Hospital, London, UK/**Urogynaecology Unit, Plymouth Hospital, Plymouth, UK.
Title: MRI OF THE PELVIC FLOOR BEFORE AND AFTER BURCH COLPOSUSPENSION: A NEW MECHANISM OF CONTINENCE?

Aims of the Study:

Genuine stress incontinence (GSI) is the commonest cause of incontinence in women, demonstrable in 40-60% of those investigated. Abnormal anatomical displacement of the bladder neck or intrinsic sphincter deficiency or both has been proposed as possible pathophysiological causes. Surgery has been demonstrated to be an effective treatment for GSI. The Burch colposuspension remains the gold standard technique, offering a long-term cure in over 80% of women.

Aims of our study were to compare the anatomical structures of the bladder neck and pelvic floor before and after surgery and to relate these with the surgical outcomes using magnetic resonance imaging.

Methods:

Women with symptoms of urinary stress incontinence and urodynamic diagnosis of genuine stress incontinence were recruited from a tertiary referral urodynamic clinic. All women underwent a Burch colposuspension performed under the supervision of the same experienced surgeons (RF, LB) between January 1995 and January 1997. All women were studied with a magnetic resonance imaging scan and urodynamics 1 week before the surgery and 1 year post-operatively. Magnetic resonance imaging scanning was performed in supine position according to a standard T2-weighted protocol using a 1.5T magnet and a torso phased array coil wrapped around the pelvis. Sagittal proton density-weighted images were recorded, using a 3mm slice thickness and no gap. The following parameters were calculated pre and post-operatively: 1) the distance between the levator ani and the pubococcygeal line (LATPCL); 2) the distance between the bladder neck and the levator ani (BNTLA); 3) the distance between the bladder neck and the lower border of the symphysis pubis in the cranial-caudal axis (BNTX); 4) the distance between the bladder neck and the lower border of the symphysis pubis in the antero-posterior axis (BNTY); 5) the posterior urethrovesical angle (BETA); 6) the distance between the bladder neck and the pubococcygeal line (BNTPCL); 7) the distance between the cervix/vaginal vault and the pubococcygeal line (VVTPCL); 8) the distance between the rectum and the pubococcygeal line (RTPCL) The measurements were in cm and had a negative or positive value dependent on whether the organ was above (negative) or below (positive) the pubococcygeal line respectively. All terms and definitions are in accordance with International Continence Society (ICS). The parameters were then compared pre and post-operatively and correlated with surgical outcomes between the group of women who were cured and those who were not after surgery. (Table 1 and 2) Data analysis was performed using the Independent t-test (SPSS inc. Chicago, USA).

Results:

A total population of 72 women were studied. The mean age was 59 years (range 48 – 69). Only 62 women (86%) were considered as 8 women (11%) did not undergo a post-operative pelvic floor MRI and 2 women did not have post-operative urodynamic studies. Finally only 28 women out of the 62 (45%) had a good quality of MRI for this study. 4 (14%) women had post-operative recurrent GSI. The distance between the bladder neck and the levator ani post-operatively (BNTLA) and the position of the bladder neck (BNTX) in the cranial-caudal axis pre-operatively were significantly different between the two groups of women ($p < .05$). None of the other parameters were significantly different between either group, even when considering changes due to the operation.

	Failed Mean(SD)	Cured Mean(SD)	P
LATPCL	-. 750 (. 420)	-. 538 (. 479)	>.05
BNTLA	-. 825 (. 789)	-. 796 (. 646)	>.05
BNTX	-.125 (1.03)	- 1.154 (. 799)	<.05
BNTY	- .375 (1.98)	- 1.546 (1.172)	>.05
BETA	134 (24.1)	115 (24.5)	>.05
BNTPCL	- .850 (.850)	- 1.204 (.625)	>.05
VVTPCL	-3.18 (.998)	-2.246 (1.367)	>.05
RTPCL	.008 (.512)	.107 (.665)	>.05

Table1. MRI parameters before surgery

	Failed Mean(SD)	Cured Mean(SD)	P
LATPCL	- 3.28 (.299)	- 2.911 (1.62)	>.05
BNTLA	-1.18 (1.24)	-.434 (.607)	<.05
BNTX	-2.55 (1.16)	-2.876 (.824)	>.05
BNTY	-1.75 (.614)	-1.811 (.874)	>.05
BETA	80.5 (26.0)	80 (18.4)	>.05
BNTPCL	-2.20 (.956)	-2.634 (.962)	>.05
VVTPCL	-2.38 (2.29)	-2.569 (1.122)	>.05
RTPCL	.125 (.629)	.334 (.914)	>.05

Table 2. MRI parameters after surgery

Conclusion:

The apposition of the levator ani muscle to the bladder neck and pre-operative position of the bladder neck in the cranial-caudal axis is associated with success after Burch colposuspension. This suggest that two mechanism may be effective in producing continence after this procedure. The apposition of the levator ani muscle with the bladder neck may produce an active mechanism to close the bladder neck during stress and prevent urinary leakage.