OBSERVATIONAL STUDY ON POSTURAL AND BIOMECHANICAL PATTERNS IN PATIENTS UNDERGOING ROBOT ASSISTED RADICAL PROSTATECTOMY WITH AND WITHOUT STRESS URINARY INCONTINENCE

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HYPOTHESIS/AIMS OF STUDY: 3%-10% of patients undergoing robotic radical prostatectomy (RRP) have a tendence to urinary incontinence[1].

The PFM provides a contribution to the stability and stiffness of the spine[2] and to the control of the sacroiliac joints[3,4]. There are now numerous evidences of PFM dysfunction in patients with SUI[5,6] and are also discovering coordination alterations between PFM and abdominal muscles in this patients.

Since, as we have seen, the functional activity of the PFM is closely related to the lumbar-pelvic control and the sacroiliac active joint stabilization mechanisms: our aim is to investigate whether there are common biomechanical postural abnormalities of the pelvic girdle in patients with SUI underwent RRP. This data, along with subsequent studies, allows us to identify the individuals most likely will run into SUI after RRP.

MATERIALS AND METHODS: From January to October 2015 62 subjects, who underwent Nerve Sparing robot assisted Radical Prostatectomy[1,7], in the last two years, at the General Hospital "F. Miulli", were assessed. The sample was subjected to the questionnaire ICIQ short form[8], 24-hours pad test and an array of postural and biomechanical assessment tests.

- Evaluation Test biomechanics of the pelvic girdle: Active Straight Leg Rise test (ASLR)[9] – One Leg Standing test[9]– Disraction test[9] – Patrick's Faber test[9] – Compression test[9].
- Assessment of "form closure" and "force closure": Palpation of the Long Dorsal Sacroiliac Ligament[9] – Observational assessment of the Lombo-Sacral angle[9] – Activation of the transversus abdominis muscles and multifidus[9].
- Test of strength evaluation (P) of the PFM Scale modified by the operator by means of Oxford (MOS)[10]

Characteristics		Overall (n=62)	Incontinent (n=32)	Non incontinent (n=30)	P value
Median Age (yrs)		64,66 ± 5,32	64,43 ± 5,24	65,3 ± 5,79	0,979
Stork Test		25 (40,32%)	17 (53,12)	8 (26,67)	0,0341
One Leg Standing Test (weight bearing limb)		35 (56,45%)	29 (90, 62)	6 (20)	<0,0001
One Leg Standing Test (limb in flexion)		25 (40,32%)	17 (53,12)	8 (26,67)	<0,05
ASLR		11 (17,74%)	11 (34,37)	0 (0)	<0,0001
Compression		39 (62,89%)	25 (78,12)	14 (46,67)	0,0098
Thight Thrust		20 (32,26%)	17 (53,12)	3 (10)	0,0002
Distraction		21 (33,87%)	17 (53,12)	4 (13,32)	0,0007
Faber		21 (33,87%)	18 (56,25)	3 (10)	<0,0001
Forme Closure	LLD	24 (38,69%)	20 (62,50)	4 (13,32)	<0,0001
	L5/S1	34 (54,84%)	32 (100)	2 (6,67)	<0,0001
Force Closure	Multifido	37 (59,68%)	26 (82,25)	11 (36,67)	0,0002
	TrA	31 (50%)	27 (84,37)	4 (13,32)	<0,0001
PERFECT SCALE (P≤3)		24 (38,71%)	23 (71,87)	1 (3,34)	<0,0001

Biomechanical Assessment Tests		Correlation coefficient r (SUI)	p Value
One Leg Standing Test (weight bearing limb)		0,711833	<0,0001
One Leg Standing Test (limb in flexion)		0,2695425	<0,05
ASLR		0,4496731	<0,001
Compression		0,3254431	<0,01
Distraction		0,4201711	<0,001
Faber		0,4883664	<0,0001
Forme Closure	LLD	0,5044394	<0,0001
	L5/S1	0,9071147	<0,0001
Force Closure	Multifido	-0,4541897	<0,001
	TrA	-0,7100469	<0,0001

DISCUSSION: Biomechanical tests showed statistically significant differences between incontinent (SUI) and non-incontinent subjects.

By examining the One Leg Standing test we can see a p value <0,0001. This statistically significant difference suggests that individuals with SUI are using an incorrect load transfer strategy through the sacroiliac joints.

All subjects who tested positive for ASRL test (n=11) were incontinent. We observed that subjects with SUI presented a lumbo-pelvic motor control deficit.

Out of 21 subjects who tested positive for Patrick's Faber test 18 were incontinent and 3 non-incontinent: this is indicative of a mobility problem of the sacroiliac and/or coxofemoral joints[9]. There is a significant correlation between the test and SUI (p <0.0001).

Out of 24 subjects who tested positive to the palpation of the long dorsal sacroiliac ligament 20 were incontinent and 4 non-incontinent. Tension of the long dorsal ligament increases with the sacroiliac joint dysfunction[11]. In our study all subjects who tested positive to this test also resulted to be positive to the observational test of the L5-S1 angle, showing a significant correlation (p <0.0001). This data, together with p <0.0001 value for the correlation between LLD test and SUI, prompts us to say that the verticalization of the sacrum could favor the onset of SUI.

There is a statistically significant difference between incontinent and non-incontinent subjects for muscular tests (Test Multifidus - p <0.001; TrA test - p <0.0001). These results suggest that the TrA muscles, multifidus and PFM work synergically and therefore should be considered as a group.

We found also a statistically significant correlation between the strength of PFM and SUI (p <0.0001).

CONCLUSION: The study results show the association between SUI after RRP and some biomechanical and postural patterns. We have founded a lumbosacral and pelvic motor control deficit and consequently the incorrect load transfer mode through the sacroiliac joints. We have also recorded the hypofunction of TrA muscles, multifidus and PFM. This suggests that in the onset of the SUI, dysfunctions of the pelvic girdle plays an important role. Also we can say that all the components of the pelvic girdle perform their functions in synergy, as a single functional system: if a single unit is insufficient the entire system suffers. There is also a significant correlation between the weakness of the PFM and SUI onset.

However we believe that the study population is numerically too low to draw any meaningful conclusions and that some of the tests used do not enjoy a good reliability intra and inter operator. The evaluation of a larger number of cases will provide more evidence, and possibly define whether these postural abnormalities and pelvic girdle dysfunctions may be predictive for SUI.

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