ePoster # 357

Functional Assessment of Human Endopelvic Fascia in Men Undergoing Radical Prostatectomy – Implications for Male Lower Urinary Tract Dysfunction

Abdelrahman Sherif Abdalla MD[1], Henry Chen BA[1], Fikunwa O. Kolawole BS MS[2], Rosalie Nolley BA[1], Chia-Sui Kao MD[3], Amy D. Dobberfuhl MD MS[1], Harcharan S. Gill MD[1]

Stanford MEDICINE

[1]Department of Urology, [2]Deptartment of Mechanical Engineering, [3]Department of Pathology
Stanford University School of Medicine, Stanford, CA, USA

BACKGROUND

Endopelvic fascia

•There are limited studies describing the contractile function of the endopelvic fascia in the male pelvis and the role of the endopelvic fascia in the pathophysiology of lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH).

AIMS

Endopelvic fascia and LUTS

• Our aim was to describe the association of endopelvic fascia and development of LUTs in patients

• In this study, we also examine the functional and histopathological features of endopelvic fascia.

METHODS

Tissue collection

- This study was approved by the local institutional review board. Ten consecutive men (aged >50 years old) with clinical stage T1c prostate cancer who underwent radical robotic prostatectomy at our institution in 2020 were recruited for this study. muscle.
- Endopelvic fascia specimens were collected from patients (n=10) undergoing robotic prostatectomy.
- Two fascia strips from each side of the pelvis were excised and immediately used for functional studies. One strip was suspended in organ bath and contractile responses to potassium chloride, and carbachol were assessed. The second strip was used for histology staining with hematoxylin and eosin and Masson trichrome for collagen and smooth muscle.

Stress strain testing

- Each sample which was excised from a region of homogenous thickness from the endopelvic fascia was used for stress strain testing. Excision was performed such that the sample length was oriented along the longitudinal axis of the prostate. The sample was immersed in 0.9% normal saline to prevent dehydration. The specimen length and width were measured with a caliper and its weight was recorded.
- The fascia was mechanically tested using an Instron 5944 microtester (100 N load cell). The sample was mounted by first clamping the specimen to the upper grip, zeroing the load cell, then clamping the specimen to the lower grip while taking care to avoid load application (**Figure 1**).

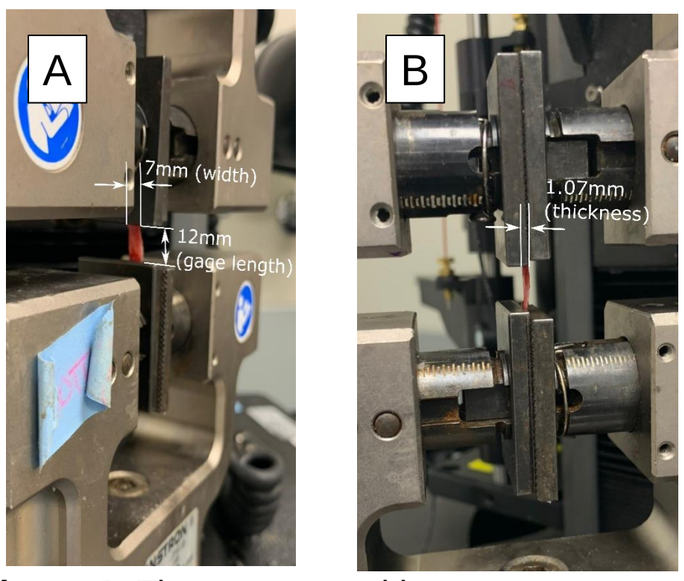

Figure 1. Tissue mounted in apparatus.
A) oblique tissue view; **B)** lateral view

- We did not use an extensometer to measure the strains because the tissue is quite soft and clamping the extensometer to it would appreciably affect the loads measured. Instead, the grip-to-grip length of the mounted sample was used as the gauge length after the sample was attached.

RESULTS

Table 1. Baseline characteristics

Criteria	Mean±SD
Age (years)	67.8±5.8
BMI (kg/m²)	25.7±6.3
IPSS	11.4±7.8
Prostate Size (cc)	49.2±27.8
PSA (ng/ml)	12.2±7.6
Patients with concomitant BPH (n)	5 (50%)
Co-morbidities (n)	2.1±1.1

Table 1. Baseline Characteristics: Endopelvic fascia specimens were collected from ten patients undergoing robotic prostatectomy. Half of the patient population had concomitant BPH n=5 (50%). Average prostate size was 49.2±27.8 cc.

Table 2. Histopathological characteristics of collected samples

Patient ID (Sample side)	Fibrous tissue (%)	Smooth muscles (%)	Fat (%)	Presence of small arterioles	IPSS	Prostate size (cc)
1 (A)	99	0	1	Yes	13	52.6
1 (B)	95	0	5	No		
2 (A)	95	5	0	Yes	11	52
2 (B)	100	0	0	No		
3 (A)	78	20	2	No	1	30
3 (B)	95	5	0	Yes		
4 (A)	95	0	5	Yes	6	63.7
4 (B)	50	0	50	No		
5 (A)	50	0	50	No	11	38
6 (A)	95	0	5	Yes	23	116
6 (B)	35	0	6	Yes		
7 (A)	98	0	2	Yes	12	21.2
7 (B)	95	5	0	No		
8 (B)	40	0	60	Yes	25	41
9 (A)	70	0	30	No	2	57.5
9 (B)	75	15	10	Yes		
10 (A)	100	0	0	Yes	10	20
10 (B)	30	10	60	No		

Table 2. Two samples per individual were obtained from ten patients during radical prostatectomy, giving a total of twenty samples. Eighteen histopathological samples of the endopelvic fascia were finally included after histopathological analysis of the samples obtained during robotic prostatectomy. One sample was excluded as only two large vascular artifacts were present with no fibrous, fatty, or smooth muscle tissue present in this slide, and another sample was excluded because it contained 100% fatty tissue which was inconsistent with the definition of fascia (Samples 5B, 8A). The endopelvic fascia was predominantly fibrous connective tissue with minor amounts of adipose tissue and rare smooth muscle. Most samples (16/18, 89%) were composed of fibrous tissue with a median of 95% of sample area; Five samples (5/18, 28%) were found to have fibrous tissue of equal or less than 50% of total composition. Fat was the second most predominant component in 12 samples (12/18, 67%)

Organ bath response: Two of the twenty samples showed contractile response to potassium chloride depolarization. There was no response to carbachol in any of the samples.

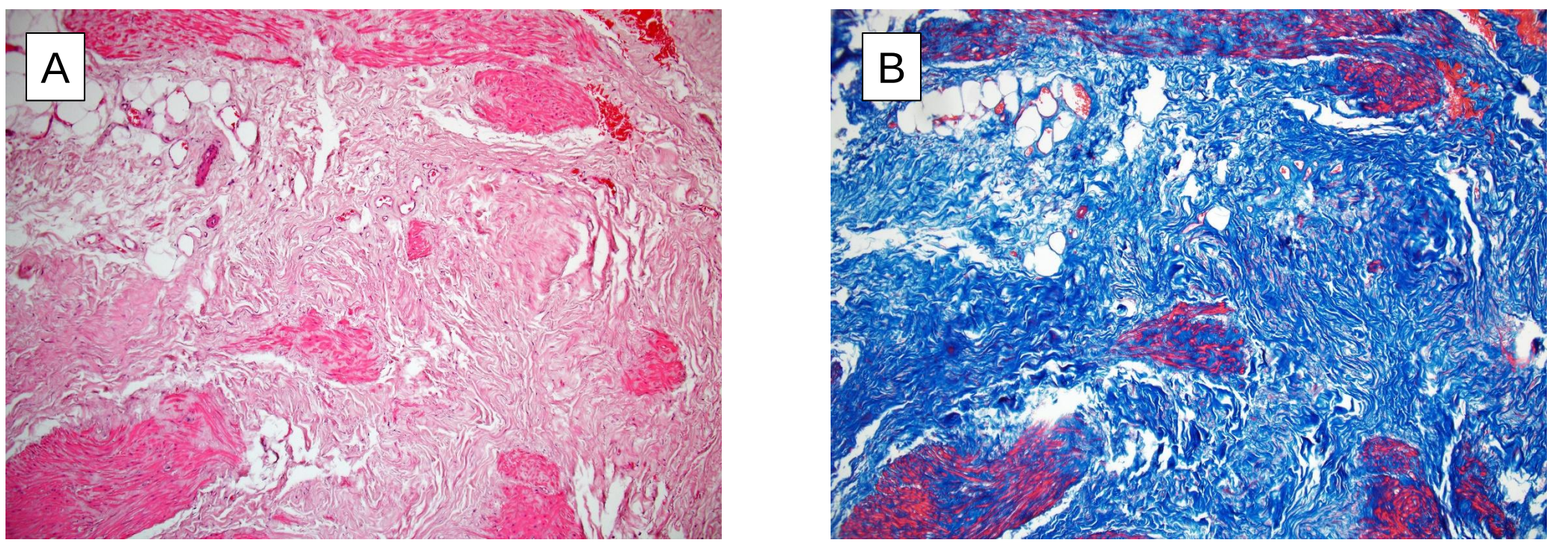

Figure 2. Tissue staining, 20x magnification
A) Hematoxylin and eosin stain of endopelvic fascia with admixed fat (top left corner) and smooth muscle bundles (top and bottom)
B) Masson trichrome stain of the same case showing collagen (blue), sparse fat and smooth muscle (red).

CONCLUSIONS

The male endopelvic fascia appears to be a mostly a non-contractile tissue. Histologically, it is similar to other fascia of the human body. It is therefore unlikely that the endopelvic fascia has a contractile role in male LUTS, although likely has a mechanical impact on the enlarging prostate, considering the high amount of fibrous tissue that can prevent the expansion of the enlarging prostate.

DISCLOSURES

- **The authors declare no conflict of interest in relationship to the content of this presentation.**