

Differences Between the Sexes: 3-month and 1-year postoperative pain after inguinal hernia repair

Marguerite Mainprize^{1,3}, Anton Svendrovski², Christoph Paasch^{1,3}, Ayse Yilbas¹, and Joel Katz⁵

Department of Surgery Shouldice Hospital¹, UZIK Consulting Inc², Department of General Surgery University Hospital Brandenburg³, Department of Psychology York University⁴

Introduction

Female sex is a well-known risk factor for chronic postoperative inguinal hernia pain [1], but the extent to which sex differences in postoperative pain after inguinal hernia repair are due to confounding variables is unclear.

The objective was to compare pain and related psychological factors 3-months [3M] and 1-year [1Y] after surgery between a sample of male and females matched on important factors that are known to be associated with chronic pain.

Methods

Data was gathered from a larger, prospective project on patients who underwent primary unilateral inguinal hernia repair at the Shouldice Hospital. Research Ethics Board approval from York University (e2019-189) and patient consent was obtained. Male and female participants were compared by manually matching 1:1 on 10 clinical and demographic variables known to be related to chronic pain. Analysis included descriptive statistics (mean ± standard deviation and frequency) and parametric and non-parametric tests comparing the sexes. $P < 0.05$ is reported as statistically significant and to control Bonferroni correction was used to adjust Type I error rate due to multiple comparisons.

Results

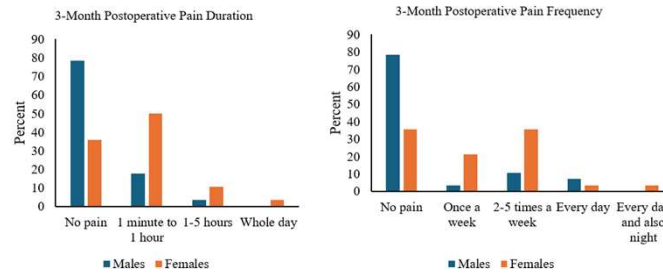
Between 06/2019 and 12/2022, 2,916 participants responded to recruitment, 844 were eligible for analysis, and 28 matched pairs at 3-months and 21 at 1-year postoperative were included (Table 1).

Table 1 3-Month and 1-Year postoperative matching variables and comparison tests (CT)

Matching Variables ¹	3-Month Postoperative		CT ²	1-Year Postoperative		CT
	Male (n=28)	Female (n=28)		Male (n=21)	Female (n=21)	
Age (years)	57.57±12.0	54.79±13.0	p=.409 ³	57.29±13.5	55.14±14.01	p=.617 ³
BMI (deciles)	5.61±2.25	5.50±2.96	p=.889 ⁴	5.29±2.61	5.71±3.27	p=.658 ⁴
Smoker	3(10.7)	3(10.7)	p=1.00 ⁵	1(4.8)	2(9.5)	p=1.00 ⁵
PHQ-4 ⁶			p=1.00 ⁷			p=1.00 ⁷
None	13(46.4)	13(46.4)		8(38.1)	8(38.1)	
Mild	8(28.6)	8(28.6)		9(42.9)	9(42.9)	
Moderate	6(21.4)	5(17.9)		3(14.3)	2(9.5)	
Severe	1(3.6)	2(7.1)		1(4.8)	2(9.5)	
Living alone	4(14.3)	3(10.7)	p=1.00 ⁸	3(14.3)	2(9.5)	p=1.00 ⁸
ASA			p=1.00 ⁹			p=1.00 ⁹
1	4(14.3)	4(14.3)		4(19.0)	3(14.3)	
2	13(46.4)	13(46.4)		13(61.9)	13(61.9)	
3	5(17.9)	6(21.4)		4(19.0)	5(23.8)	
Preoperative persistent pain	6(21.4)	6(21.4)	p=1.00 ⁹	4(19.0)	4(19.0)	p=1.00 ⁹
Preoperative hernia pain	18(64.3)	18(65.3)	p=1.00 ⁹	14(66.7)	14(66.7)	p=1.00 ⁹
Preoperative PCS-4 ¹⁰	5.50±3.61	5.89±3.90	p=.790 ¹¹	5.62±3.76	5.90±3.97	p=1.00 ¹¹
Nerves divided	2(7.1)	2(7.1)	p=1.00 ¹²	2(9.5)	2(9.5)	p=1.00 ¹²

¹Notes: reported values are frequency (%) or mean ± standard deviation.
²Independent samples t test. ³Mann-Whitney test. ⁴Fisher's exact test. ⁵Chi-squared test.
⁶PHQ-4 refers to the 4-item Patient Health Questionnaire for Depression and Anxiety.
⁷PCS-4 refers to the 4-item Pain Catastrophizing Questionnaire.

At 3M postoperative, 18 females and 6 males had pain ($p=.001$), with females reporting more frequent ($p=.004$) and longer duration ($p=.005$) of pain episodes (Figure 1).



No significant differences were found in the incidence (male: 28.6% and female: 52.4%, $p=.116$), frequency ($p=.330$), or duration ($p=.209$) of pain between the sexes at 1Y after surgery.

Significantly higher BPI pain severity scores were found for females at the 3M postoperative time. The 3M and 1Y postoperative brief pain inventory [BPI] NRS results are shown in Table 2.

Table 2 Brief Pain Inventory (BPI) pain severity scores during the 3-month and 1-year postoperative time

Questionnaire ¹	CT ²		
	Male (n=28)	Female (n=28)	
3-Months Postoperative			
Worst	0.32±0.77 [0-3]	1.61±1.85 [0-6]	p=.002 ³
Least	0.07±0.26 [0-1]	0.43±1.36 [0-6]	p=.036 ³
Average	0.14±0.45 [0-2]	0.86±1.08 [0-4]	p=.002 ³
Now	0.00±0.00 [0-0]	0.43±1.20 [0-6]	p=.010 ³
1-Year Postoperative			
Worst	0.38±0.97 [0-4]	1.14±2.03 [0-7]	p=.228 ³
Least	0.00±0.00 [0-0]	0.19±0.40	p=.038 ³
Average	0.19±0.68 [0-3]	0.71±1.10 [0-4]	p=.019 ³
Now	0.05±0.22 [0-1]	0.48±1.37 [0-6]	p=.146 ³

¹Notes: reported values are Mean ± standard deviation [range].
²1348 Mann-Whitney test. To control for Type I Error, Bonferroni correction was used to adjust the level of significance. For example, the NRS scale has 4 items, therefore the adjusted level of significance 0.05/4 = 0.0125 was used for individual tests.

Significant differences were not found at the 3M or 1Y time points between the sexes related to pain interference with daily activities, PHQ, PCS, or resilience.

Discussion

3-Months Postoperative

The results at 3-months indicate a sex difference, with females experiencing an increased incidence, frequency, duration, and severity of postoperative pain. Since many of the prominent factors affecting pain were controlled for by matching males and females, other explanations, that were not explored in this study, may be the attributable cause. These could include differences in groin structures, gynecological factors, as well as cultural, social, and/or biological influences.

1-Year Postoperative

At 1-year significant differences between the sexes were not found, which contrasts with other studies that also matched male and female hernia patients. However, those studies did not match on any psychological variables [2-4]. It is possible that the absence of sex differences in pain 1-year after surgery in the present study relates to our matching on psychological factors known to contribute to pain in contrast other studies.

Conclusions

After matching on important confounders, female patients experienced pain at a higher incidence and severity 3-months after primary unilateral inguinal hernia repair, but by 1-year after surgery the differences were no longer significant.

References

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