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De novo pain and relief of pain after abdominal synthetic mesh implants

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ABSTRACT

Introduction: This study assessed the incidence, severity and risk factors for pain after abdominal mesh usage in pelvic floor prolapse surgery.

Methods: Prospective observational cohort study (NCT01598467, clinical trials.gov) performed in a tertiary referral center for patients with gynecological prolapse. Women undergoing robot-assisted sacrocolpopexy (RASC) or supracervical hysterectomy with sacrocervicopexy for the treatment of pelvic organ prolapse were included (2014–2018). Primary outcome was presence and degree of pre- and postoperative pain. Secondary outcomes were quality of life, dyspareunia and risk factors for postoperative pain. Pre- and postoperative interviews and validated questionnaires were used to assess pain severity and location. A Numeric rating scale (NRS; 0-10; 0 no pain and 10 highest pain score) was included in the questionnaire. 'De novo pain', 'ongoing pain' and 'resolved pain' were respectively described as: Pain solely present postoperatively, pain present both pre- and postoperatively and pain present preoperatively, but resolved postoperatively. The Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) and the quality of life Pelvic Floor Impact Questionnaire (PFIQ-7) were used.

Results: 115 subjects who underwent abdominal mesh implant surgery were included. Mean follow-up duration was 12.8 3.7 months. The preoperative prevalence of patient self-reported pain was 52%, postoperative self-reported pain was 24%. De novo pain was found in 4.3%. Self-reported ongoing pain was noted in 18%. In 29%of patients the pain had resolved after surgery. Preoperative pain and previous intra-abdominal surgery were identified risk factors for postoperative pain (intra-abdominal surgery OR 3.6, 95% CI 1.2-10.7; preoperative NRS pain score OR 1.4, 95% CI 1.1-1.7). Less women reported dyspareunia postoperatively (49% versus 36%). Total PFIQ-7 scores decreased significantly (Total PFIQ-7: -49) postoperatively, indicating improvement in quality of life.

Conclusion: Pain is mostly reduced or resolved and less dyspareunia is reported after abdominal pelvic floor surgery with mesh implants for pelvic organ prolapse.

1. Introduction

Women with Pelvic Organ Prolapse (POP) can have a variety of symptoms, including pelvic pain or back pain. After primary surgical correction, a very high percentage of patients require re-operation because of recurrent prolapse [1]. Because of this significant recurrence rate, several types of synthetic implants were introduced for transvaginal surgery more than ten years ago. These "mesh kits" were used to restore the anatomical position of the vagina and strengthen the vaginal walls to treat prolapse and prevent recurrence. The same material has an even longer history of use in numerous procedures, including inguinal and abdominal wall herniation, abdominal prolapse surgery for gynecological/bowel prolapse and in urinary incontinence surgery. Sacrocolpopexy (SC), in which transabdominal mesh is used, is a proven treatment for apical/vault prolapse. This open procedure was first reported by Lane in 1962, in which the prolapsed vaginal vault was attached to the sacral promontory with synthetic material (mesh/implant) [2]. The procedure has evolved and improved over the years and now the standard procedure is performed laparoscopically with or without robot-assistance. A large review of Serati et al. showed recurrences after this surgery to be low (apical cure rate 97%–100%) [3]. The European Scientific Committee on Emerging and Newly Identified Health Risks (SCENHIR), the National Institute for Health and Care Excellence (NICE in the UK) and the American Food and Drug Administration (FDA) statements support SC for the treatment of POP [4–6].

Persistent postoperative pain is one of the most feared complications by patients [7]. The role of implants as a cause for pain has arisen in the last few years. Several national governmental institutions either stopped the use or published strict guidelines for the use of implants [8–11]. In the UK the surgical use of mesh has been prohibited. A report of the Independent Medicines and Medical Devices Safety

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Review in the UK has imposed a strict ruling which needs to be followed before this ban on mesh will be relieved [7]. These rulings are mainly based on individual reports from patients. From these reports the clear message is that there is a lack of recognition, and therefore also poor treatment for patients, sometimes suffering from severe pain. The individual reports, however, lack significant information, such as type of implant, mesh type, exact surgical procedure, and complication rate for a specific implant usage and type. Postoperative mesh related complications are high after transvaginal mesh, but *not* after every type of mesh. In the guidelines on mesh implants, this distinction is hardly made, resulting in a ban on all mesh types, instead of solely transvaginal mesh. Also, one needs the denominator, i.e. how many patients underwent a particular operation. Subjective symptoms like pain need especially well-documented pain sensation scores, both pre- and postoperatively. This is because the normal prevalence, without prolapse, of non-cyclical pain in the female population is estimated at 4%–43% and for dyspareunia at 1%–46% [11]. National institutions like the FDA and National Health Service (NHS) recommend setting up national databases. However, publication of results from national databases can take a long time, specifically of those complications which occur rarely and after a longer period of time. Scientific evidence shows a large difference in complication rates between the use of different types of implants and surgeries [12].

This study was set up to address this knowledge gap. This large cohort study on the role of the internationally most commonly used mesh type (polypropylene) was set up prospectively (known denominator). The study presents data on the incidence, severity and risk factors for pain after abdominal sacrocolpopexy for apical prolapse.

2. Materials and methods

All patients were treated between 2014 and 2018 in a large teaching hospital with a tertiary referral center for patients with POP. Consecutive patients undergoing robot-assisted sacrocolpopexy (RASC) or supracervical hysterectomy with sacrocervicopexy (RSHS) for middle compartment prolapse were included. Exclusion criteria were: women <18 years, inability to undergo general anesthesia, history of ≥ 3 laparotomies, concomitant mesh surgery (e.g. mid-urethral sling, transvaginal mesh) and an absent baseline preoperative pain status record. This study was part of The Prospective Assessment of Robotic Sacrocolpopexy database (PARSEC; NCT01598467, clinicaltrials.gov). The study was judged as an exempt study by The National Central Committee on Research Involving Human Subjects (CCMO) as patients were solely exposed to regular postoperative visits (including questionnaires) as advised by Dutch law. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Primary outcome was presence and degree of postoperative pain. Secondary outcomes were QoL, dyspareunia and risk factors for postoperative pain. Enrolled patients completed questionnaires prior to surgery and 12 months postoperatively. A numeric rating scale (NRS; 0–10; 0 no pain; 10 highest pain score), used for the self-evaluation of pain, and description of the pain location when present, were included in the questionnaire. Patients were asked to report the presence of pain or the feeling of discomfort of the previous four weeks. The pain was further specified in the following categories: 'lower backpain', 'dyspareunia', 'pain during defecation' and 'other'. Numeric rating scales scores were classified as: 'mild' (NRS 1–3), 'intermediate' (NRS 4–6) or 'serious' (NRS 7–10). Absent pain preoperatively and present pain postoperatively was defined as 'de novo pain'. 'Ongoing pain' was described as both pain present preoperatively as postoperatively. 'Resolved pain' was scored if pain was present preoperatively, but absent postoperatively. The ICS pain classification is the preferred method of scoring (mesh-related) pain [13–15]. With aid of this classification, type of pain and pain for each organ can be further specified. At the start of this study however, our questionnaires did not include this classification and the terms described as above were used.

Further assessment included The Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12), which scores sexual activity, barriers to activity and dyspareunia [16]. To assess QoL, the Pelvic Floor Impact Questionnaire (PFIQ-7) was used, with three subscales on urinary, rectal and pelvic organ prolapse [17]. A higher score indicates a higher impact of complaints on daily life (total 0–300, subscale range 0–100). Use of these specific questionnaires were in line with the recommendations regarding Dutch postoperative care after mesh surgery. Demographic, medical, and surgical details were abstracted from electronic medical records. One day postoperative pain scores were noted (NRS, scale 0 to 10). If patients declined follow-up at 12 months, they were invited to return the questionnaire by mail. Loss to follow-up was defined as: no questionnaire or clinical consultation available at 12 months follow-up.

2.1. Surgical technique

Surgical techniques and materials have been described in detail previously [18,19]. In short, all procedures were performed with aid of the da Vinci Si-HD system (Intuitive Surgical, Inc, Sunnyvale, CA). Pneumoperitoneum was created through a Veress needle or Hasson open entry. Placement of two 12-mm and three 8-mm robotic trocars followed (intra-abdominal pressure 12 mmHg). Patients were placed in the lithotomy and Trendelenburg positions. The peritoneum was incised to reveal the promontory and to create an anterior vesicovaginal and posterior rectovaginal space. The mesh (Prolene; weight 80–85 g/m2; Ethicon Inc, Johnson & Johnson, Hamburg, Germany) was sutured distally with nonabsorbable sutures to the posterior and anterior vaginal wall and vaginal cuff or cervix. The 2 meshes were configured intracorporeally to a Y-shape. The posterior mesh was attached proximally to the sacral promontory at the longitudinal ligament with titanium tacks (Autosuture Protack 5 mm; Covidien, Minneapolis, MN). The peritoneum was closed over the graft with a V-Loc suture (Covidien).

2.2. Statistics

Data were processed anonymously (FZ, LH). Statistical analysis was performed using SPSS version 24.0 (IBM Corp., Armonk, NY, USA). Normally and not normally distributed values were presented as mean ± standard deviation (SD) and median and range respectively. Two-sided independent or Paired samples t-test, Mann–Whitney U Test or Wilcoxon signed-rank test, X^2 test or Fisher's Exact Test were used as appropriate. Logistic regression analysis was performed to determine possible predictors of postoperative pain.

3. Results

One hundred fifteen subjects who underwent abdominal mesh implant surgery were eligible for inclusion. There were no patients excluded due to a history of ≥ 3 laparotomies. Eight patients (7.0%) were lost to follow-up (RASC: n = 4; RSHS: n = 4). For two patients (1.7%, both RSHS), only the postoperative questionnaires were available. Median duration of follow-up was 12.8 ± 3.7 months. Table 1 summarizes patient characteristics. Women who underwent a RSHS were significantly younger and more women had a history of mesh surgery compared to RASC.

Presence of pain and pain scores for severity of pain are shown in Table 2. Self-reported ongoing pain was 18%. In 29% of patients with pre-operative self-recorded pain, the pain had resolved after surgery. Five patients (4.3%) reported de novo pain; 3 of these 5 patients reported 'mild pain (NRS 1–3)', one reported serious pain (NRS 7–10) and one patient reported de novo pain, but did not record the NRS score. At follow-up of the five 'de novo pain patients', one patient presented with inguinal pain. Ultrasound confirmed an inguinal herniation, with was surgically corrected. Patient's history revealed 6 spinal surgeries

Table 1
Patient demographics.

	All subjects (N = 115)	RASC (n = 39)	RSHS (n = 76)	*p* value[a]
Mean age (SD)	62.7 ± 10.7	65.6 ± 9.4	61.1 ± 11.1	0.033
ASA-classification, N (%)				0.137
- ASA 1	48 (41.7)	14 (35.9)	34 (44.7)	
- ASA 2	62 (53.9)	25 (64.1)	37 (48.7)	
- ASA 3	4 (3.5)	0 (0.0)	4 (5.3)	
- Unknown	1 (0.9)	0 (0.0)	1 (1.3)	
Mean BMI (SD)	25.3 ± 3.7	25.1 ± 4.0	25.4 ± 3.6	0.756
Median parity (range)	2 (0–7)	2 (1–7)	2 (0–7)	0.136
Smoking, N (%)	14 (12.2)	4 (10.3)	10 (13.2)	0.769[b]
Fibromyalgia, N (%)	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Diabetes, N (%)	6 (5.2)	2 (5.1)	4 (5.3)	1.000[b]
Previous intra-abdominal surgery (%)	59 (51.3)	19 (48.7)	40 (52.6)	0.511
Previous hysterectomy (%)	39 (33.9)	39 (100)	0 (100)	<0.0001
Previous mesh surgery,[c] N (%)	10 (8.7)	7 (17.9)	3 (3.9)	0.030[b]
Preoperative backpain, N (%)	60 (52.2)	23 (59.0)	37 (48.7)	0.296
Mean preoperative pain score/NRS (SD)	2.8 ± 2.9	2.9 ± 2.9	2.8 ± 2.9	0.882
Sexually active, N (%)	70 (60.9)	20 (51.3)	50 (65.8)	0.035
Unknown	6 (5.2)	0 (0)	6 (7.9)	
Dyspareunia, N (%)	8 (7.0)	3 (7.7)	5 (6.6)	0.226[b]
Sometimes	26 (22.6)	9 (23.1)	17 (22.4)	
Median preoperative sPOPQ (range)				
Ba	3 (1–4)	3 (1–4)	3 (1–4)	0.847
Bp	2 (1–4)	3 (1–4)	2 (1–4)	0.038
C	3 (1–4)	3 (2–4)	3 (1–4)	0.195
D	2 (1–4)	3 (1–4)	2 (1–4)	0.297
Median postoperative sPOPQ (range)				
Ba	1 (1–3)	1 (1–3)	1 (1–3)	0.518
Bp	1 (1–3)	1 (1–3)	1 (1–3)	0.836
C	1 (1–2)	1 (1–1)	1 (1–2)	0.480
D	1 (1–2)	1 (1–1)	1 (1–2)	0.674
Intraoperative complication, N (%)	2 (1.7)	2 (5.1)	0 (0.0)	0.113[b]
Conversion, N (%)	2 (1.7)	0 (0.0)	2 (2.6)	0.548[b]
Concomitant surgery, N (%)	12 (10.4)	3 (7.7)	9 (11.8)	0.748[b]
Single/bilateral adnectomy	11 (9.6)	2 (5.1)	9 (11.8)	
Remove mesh exposure	1 (0.9)	1 (2.6)	0 (0.0)	

Abbreviations: *ASA score* American Society of Anesthesiologist score *BMI* Body-Mass Index *N number N/A* not applicable *NRS* Numeric Rating Scale *POP* Pelvic organ prolapse *RASC* Robot-assisted sacrocolpopexy *RSHS* Robot-assisted supracervical hysterectomy with sacrocervicopexy *sPOPQ* simplified pelvic organ prolapse quantification *SD* standard deviation.

[a]Comparing RASC with RSHS.

[b]Fisher's Exact Test.

[c]Abdominal prolapse mesh surgery (sacrocolpo[recto]pexy), transvaginal mesh surgery or mid-urethral mesh surgery.

Table 2
Numeric rating scales (NRS) on pain.

	All patients N = 115	RASC n = 39	RSHS n = 76
Pre-existing pain, N (%)	60 (52.2)	23 (59.0)	37 (48.7)
Ongoing pain, N (%)	21 (18.3)[a]	7 (17.9)	14 (18.4)
Resolved pain, N (%)	33 (28.7)[b]	13 (33.3)	20 (26.3)
De novo pain, N (%)	5 (4.3)[c]	2 (5.1)	3 (3.9)
NRS scores one day postoperative, mean ±SD	2.4 ± 1.6	2.5 ± 1.5	2.4 ± 1.7
NRS scores 12 months postoperative, mean ±SD	1.4 ± 2.5	1.5 ± 2.7	1.4 ± 2.4

Patient self-reported pain scores (0 is no pain 10 is worst pain).

[a]Mean NRS score in patients with ongoing pain was 5.3 ± 2.2 preoperatively and 5.0 ± 2.0 postoperatively.

[b]14 reporting preoperative 'mild pain (NRS 1–3)', 10 'intermediate pain' (NRS 4–6), 6 'serious pain' (NRS 7–10). In 3 patients no preoperative NRS score is available.

[c]3 reporting postoperative 'mild pain (NRS 1–3)', one reporting serious pain (NRS 7–10), one patient reported de novo pain, but no NRS score.

performed by a neurosurgeon. The second patient her stress, urge and urge incontinence symptoms had increased during follow-up for which medication and a paraurethral bulking agent was started. The third patient had worsened pain. The fourth patient stated at follow-up that she had heard a 'snap' in her lower back and had suffered from pain since. She was referred to another department and was diagnosed with osteoporosis. The last patient with de novo pain had an early postoperative infection at the trocar incision. She developed more back pain. Further diagnostics were initiated, but abandoned due to claustrophobic reasons. This patient consulted a neurosurgeon in another hospital. None of the patients was diagnosed with discitis.

For the patients who reported ongoing pain, there was no statistically significant difference between preoperative and postoperative NRS scores (5.0 ± 2.0 and 5.3 ± 2.2 respectively; p = 0.379). Twenty-nine percent of patients (n = 33) reported that their pain had resolved after surgery. In 14 of these patients the reported preoperative pain scores were 'mild' (NRS 1–3), in 10 patients 'intermediate' (NRS 4–6) and in 6 patients 'serious' (NRS 7–10).

The prevalence of pain preoperatively reported by the patient was 52.2%. Table 3 shows postoperative pain which was reported in 30.8% (missing 3.7%). Twenty-one percent reported this pain to be lower back pain. Of the sexually active women, 48.6% (34/70) reported symptoms of dyspareunia preoperatively (sometimes or always) versus 36.4% (24/66) of women postoperatively.

Table 4 shows the life impact PFIQ-7 scores. Both subscales as the total PFIQ-7 scores decreased significantly (Total PFIQ-7: -49).

In Table 5 the PFIQ-7 scores are further subdivided, based on the presence of pre- or postoperative pain. All patients with or without pain symptoms preoperatively showed improvement. The total number of patients reporting pain postoperatively is lower than preoperatively. Those patients who reported preoperative pain, perform significantly worse than those without pain preoperatively. When comparing the

Table 3
Postoperative patient self-reported pain location.

Group	No pain	Lower back	During defecation	Other	Missing
All subjects n = 107 (%)	70 (65.4)	22 (20.6)	1 (0.9)	10 (9.3)	4 (3.7)
RASC n = 35 (%)	24 (68.6)	7 (20.0)	0 (0.0)	3 (8.6)	1 (2.9)
RSHS n = 72 (%)	46 (63.9)	15 (20.8)	1 (1.4)	7 (9.7)	3 (4.2)

Abbreviations: *RASC* Robot-assisted sacrocolpopexy *RSHS* Robot-assisted supracervical hysterectomy with sacrocervicopexy.

Table 4
Pre- and postoperative patient self-reported PFIQ-7 scores.

	Mean preoperative PFIQ-7 scores	Mean postoperative PFIQ-7 scores	P value
Bladder	21.7 ± 23.1	6.4 ± 14.6	<0.0001
Rectal	12.8 ± 20.6	4.8 ± 11.4	0.001
Vagina	32.8 ± 29.0	7.1 ± 17.6	<0.0001
Total	67.9 ± 60.5	18.7 ± 35.5	<0.0001

Pelvic Floor Impact Questionnaire (PFIQ-7) for pelvic floor related quality of life (QoL). A higher score indicates a higher impact of complaints on daily life (range 0–100). Patients scoring on bladder, bowel, or vaginal symptoms and how much these affect their activities. The validated Dutch version of this questionnaire was used. [16] A change of −12 points is seen as a statistic improvement on quality of life [20].

group reporting pain preoperatively and those reporting postoperative pain, the scores on the PFIQ-7 are lower postoperatively.

Logistic regression analysis demonstrated that both a previous history of intra-abdominal surgery and the pre-operative pain score (NRS) were significantly correlated to the occurrence of postoperative pain (intra-abdominal surgery OR 3.6 95% CI 1.2–10.7; preoperative NRS pain score OR 1.4 95% CI 1.1–1.7).

4. Discussion

In this study, the prevalence of self-reported preoperative pain was 52%, Postoperatively, this prevalence was 31%. Do novo pain was found in 4% and relief of pain after surgery was 29%. Preoperative pain and previous intra-abdominal surgery were identified risk factors for postoperative pain.

Chronic postoperative pain has been defined for the ICD-11 (sub-3.1). The definition is: persistent postoperative pain lasting longer than 3 months, termed chronic as it lasts for longer than the normal wound healing time of 3 months [21]. The WHO performed a systematic review in which the prevalence of non-cyclical pain in the general female population was estimated at 4%–43% [11]. The term chronic pelvic pain (CPP) refers to the anatomical–physical basis of the pain [22]. The etiology of CPP consist of a wide range of pathological mechanisms: myofascial, skeletal, psychological, genitourinary, bowel disease, gynecologic diseases, gastrointestinal and some benign and malignant conditions. More than 70 diagnoses have been described [23]. Chronic pain is one of the most feared postoperative complications. The incidence of CPP for the transvaginal use of mesh reported is variable (0%–35%) [1,24,25]. Reports on chronic pain after purely abdominal procedures are scarce. Geller et al. showed results after mesh procedures [26]. The patients were identified retrospectively by procedural codes. One in six (15.6%) patients reported de novo pain. Confounding factors were younger age, early postoperative pain and fibromyalgia. This study was retrospective, used more than 4 different types of mesh and the existence of preoperative pain remained unclear.

Reconstructive traditional native tissue POP surgery is associated with a high recurrence rate up to 58% [27]. This kind of traditional surgery has also been shown to cause pain as a long-term complication. In a large Cochrane review no difference was found between the rate of dyspareunia after traditional vaginal surgery with and without mesh [28]. Many types of surgery can result in chronic postoperative pain. For example, a cesarean section, literature describes in 1%–30% of patients suffering from postoperative chronic pain [29].

The incidence of chronic postoperative pain is described as being much lower after transabdominal use of mesh compared to vaginal mesh. A recent study, consisting of 975 abdominal mesh implants, showed de novo chronic pain in 1.6% of patients [30]. Unfortunately, this study does not have a denominator and is very heterogeneous, as the specific mesh and type of surgery remain unknown.

We found that in 29% of patients pain was relieved by the surgery. Although the relief of pain after surgery for POP is well recognized [31], to our knowledge there is no prior publication describing the relief of pain after abdominal mesh surgery in the literature. Based on the total PFIQ-7 score, we found a reduced impact of pelvic floor symptoms on daily life. A change of minus 12 on the PFIQ-7 is considered a significant effect [20].

Lumbar discitis is a major, but rare complication after sacrocolpo-(recot)pexy. Bacterial translocation to the site of fixation at the sacral

Table 5
Pre- and postoperative patient self-reported PFIQ-7 scores. Divided in specific patient groups with and without pre- or postoperative self-reported pain symptoms.

		Mean preoperative PFIQ-7 scores	Mean postoperative PFIQ-7 scores	Mean decrease in scores	P value
Preoperative pain YES	*Bladder*	28.0 ± 25.5	9.3 ± 18.5	18.7	<0.0001
	Rectal	16.4 ± 22.4	7.6 ± 14.5	8.8	0.016
	Vagina	36.0 ± 31.3	10.1 ± 22.5	25.9	<0.0001
Preoperative pain NO	*Bladder*	15.1 ± 18.6	3.4 ± 8.2	11.7	0.001
	Rectal	8.6 ± 17.8	1.6 ± 4.8	7.0	0.013
	Vagina	29.3 ± 26.2	3.7 ± 8.3	25.6	<0.0001
Postoperative pain YES	*Bladder*	31.9 ± 24.6	16.0 ± 23.4	15.9	0.002
	Rectal	23.3 ± 22.5	12.1 ± 18.3	11.2	0.059
	Vagina	39.0 ± 25.9	15.0 ± 23.6	24.0	0.001
Postoperative pain NO	*Bladder*	18.5 ± 21.7	3.2 ± 8.0	15.3	<0.0001
	Rectal	9.1 ± 18.8	2.2 ± 5.8	6.9	0.005
	Vagina	31.0 ± 30.0	4.3 ± 14.1	26.7	<0.0001

Pelvic Floor Impact Questionnaire (PFIQ-7) for pelvic floor related quality of life (QoL). A higher score indicates a higher impact of complaints on daily life (range 0–100). Patients scoring on bladder, bowel, or vaginal symptoms and how much these affect their activities. A change of −12 points is seen as a statistic improvement on quality of life [20].

promontory, which is more likely to occur in surgery that includes rectopexy, might be related to cause this infection [32]. In patients with severe persisting postoperative lower back pain (in combination with fever), this complication should be considered. If there was a suspicion for lumbar discitis in our cohort an MRI was performed to exclude this diagnosis. In this current study we did not identify any patients with discitis.

One strength of this study is the long follow-up, as the international definition for chronic pain is 'pain lasting for more than 3 months post-operatively'. Secondly this study was prospective and described both self-reported pre- and postoperative pain. For this current study the denominator is known. Uniquely from almost all previous publications, this study shows the percentages of pain relief and of de novo pain for RASC with use of this specific polypropylene mesh.

There are also limitations for this study, the research was performed in one single center and the surgery was performed by two experienced surgeons. This center has a tertiary referral function for patients with POP. Patients often had a history of pelvic floor disorders and prior surgical POP treatment, which might influence the generalizability of this study. Another limitation is the calculations of the PFIQ-7. When mean scores are calculated, these are the means of the entire group, and these outcomes may not be generalizable to an individual patient. The description of the specific location of the pain and if the pain was directly associated with presence of prolapse or performance of the surgery is another limitation of this study. However, the absence of pain is a very strong objective parameter and therefore we feel the results of this study still provide a realistic view. Future research should focus on describing and evaluating pre- and postoperative pain after prolapse surgery with aid of the ICS pain classification [13–15]. A more precise distinction between pain for each organ and type of pain can then be made.

Mesh procedures can sometimes cause postoperative (chronic) pain. This has been neglected and has often resulted in poor management. The wide range of complication rates described in the international literature is a cause of concern. The heterogeneity of reports makes it difficult for patients, doctors and governmental institutions to draw conclusions. Patient groups and the accompanying negative publicity are often based on these overall complication rates for all mesh procedures, whether vaginal or abdominal, and also for urinary incontinence. Internationally this has led to well-organized patient pressure groups, challenging the overall use of mesh procedures and creating a political agenda, forgetting the silent majority of those patients with excellent postoperative outcomes.

5. Conclusions

This current study, using patient self-reported questionnaires, demonstrates that after a robot-assisted abdominal procedure for POP, with mesh implant, Quality of life improves significantly, the incidence of de novo chronic pain is low, and patients suffering from preoperative pain are relieved from this pain in 29%. This publication could be of assistance in the decision making for patients and their doctors, when considering mesh surgery.

Declaration of competing interest

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to https://doi.org/10.1016/j.cont.2022.100514. S.E. Schraffordt Koops reports a relationship with Intuitive Surgical Inc (proctor) that includes: speaking and lecture fees and travel reimbursement.

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