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Port-site incisional hernia – A case series of 54 patients

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HIGHLIGHTS

- This study is one of the largest series concerning port-site incisional hernia (PIH) regarding the current literature.
- In Port sites of 10 mm and larger diameter fascia should be closed by suture the current literature.
- PIH should be treated by suture or mesh repair depending on fascial defect size and the patients' risk factors.

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ABSTRACT

Background: The increased use of laparoscopy has resulted in certain complications specifically associated with the laparoscopic approach, such as port-site incisional hernia (PIH). Until today, it is not finally clarified if port-site closure should be performed by fascia suture or not. Furthermore, the optimal treatment strategy in PIH (suture vs. mesh) is still widely unclear. The aim of this study was to present our experience with PIH in two independent departments and to derive possible treatment strategies from these results.

Methods: Between 2003 and 2013, 54 patients were operated due to port-site incisional hernia in two surgical centres. Their data were collected and retrospectively analyzed depending on surgical technique of port-site hernia repair (Mesh repair group, n = 13 vs. Suture only group, n = 41).

Results: Port site incisional hernia occurred in 96% (52 patients) after the use of trocars with 10 mm or larger diameter. Patients treated with mesh repair had significantly higher *body mass index (BMI)* (32 ± 9 vs. 27 ± 4; p = 0.023) and significantly higher rates of cardiac diseases (77% vs. 39%; p = 0.026) than patients in the suture only group. Mean fascial defect size was significantly larger in the *Mesh repair group* than in the *Suture only group* (31 ± 24 mm vs. 24 ± 32 mm; p = 0.007) and mean time of operation was significantly longer in patients operated with mesh repair (83 ± 47 min vs. 40 ± 28 min; p < 0.001). There were no significant differences in mean hospital stay (3 ± 4 days; p = 0.057) and hernia recurrence rates (9%; p = 0.653) between study groups. Mean time of follow up was 32 ± 35 months.

Conclusions: In Port sites of 10 mm and larger diameter fascia should be closed by suture, whereas the risk of hernia development in 5 mm trocar placements seems to be a rare complication. Port-site incisional hernia should be treated by suture or mesh repair depending on fascial defect size and the patients' risk factors regarding preexisting deseases and *body mass index.*

1. Introduction

Laparoscopic surgery is widely practiced and in many cases, it offers realistic benefits over conventional surgery [1]. On the other hand, the increased use of laparoscopy has resulted in added complications specific to the laparoscopic approach, such as port-site incisional hernia (PIH).

Although its incidence is variable, it is potentially dangerous and can lead to considerable morbidity requiring surgical intervention [2,3]. Several studies show an incidence of port-site hernia ranging from 1% to 22% [1,4,5] but the real incidence may be higher, as some patients remain asymptomatic or do not return to the primary

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surgeon [2].

Since various factors have been implicated for the development of port-site hernia [6], various methods are also suggested for its prevention [7–9]. But until today, it is not finally clarified how to close laparoscopic port-sites defects [10,11]. Whereas the classical method of port-site closure by suture is widely used because of its simplicity and cost effectiveness, in some cases, this closure can be difficult and is associated with the predictable fear of injuring or including the underlying bowel loops, omentum, or other abdominal organs by the needle [12,13]. This may result in less optimal closure and subsequent complications, including port-site incisional hernia. In these cases of PIH, the optimal treatment strategy (suture vs. mesh) is yet not clarified.

Thus, the aim of this study was to describe our experience with port-side hernias presenting a series of 54 patients with PIH operated in two surgical centres during ten years and investigated their preoperative status, their operative details and their postoperative course.

2. Materials and methods

Data was drawn from a two-centre retrospective cohort study. All patients receiving port-site hernia repair between 2003 and 2013 were retrospectively analyzed. One centre is the local university hospital, the other one is an independent hospital close to the university. There was no ethical approval needed for the study. The work has been reported in line with the PROCESS criteria [14].

Demographic details were registered as well as clinical details and complication rates (Tables 1 and 2). In evaluation of preexisting co-morbidities, cardiac diseases included the presence of coronary heart disease, history of cardiac infarction and cardiac insufficiency. Renal insufficiency was determined by a raise in creatinine beyond 1.2 mg/dl or blood urea nitrogen beyond 50 mg/dl. Pulmonary diseases included the presence of chronic obstructive pulmonary disease, bronchial asthma with need for medical treatment and any other pulmonary dysfunction (Table 1).

Investigating the operative details, fascial defect size, the previous port-site size and operation time was documented. Postoperatively, length of in-hospital stay and hernia recurrence rates were included (Table 2).

In both study centres, port-sites of 10 mm size and larger were standardized sutured. Table 3 shows the suture materials used. 5 mm port-sites were left without any suture.

Port-site incisional hernia with fascial defects larger than 2–3 cm were standardized treated by mesh repair in sublay position (Ultrapro®, FA Ethicon Inc., Somerville, N.J., USA), whereas smaller fascial defects were continuously sutured (Prolene®, USP-Size 0, FA Ethicon Inc., Somerville, N.J., USA). Skin was closed continuously with Monocryl® of USP-Size 4-0 (FA Ethicon Inc., Somerville, N.J., USA).

2.1. Statistical analysis

Statistical analysis was carried out using the Statistical Package for Social Sciences software (SPSS®, Vers.17.0, Chicago, IL, USA). Differences between study groups were analyzed by Kruskal-Wallis test for non-parametric data and in case of significant differences confirmed by Mann-Whitney test. For numeric data differences were analyzed by ANOVA and in case of significance confirmed by T-Test. P-values < 0.05 were considered to be significant. All data are represented as mean ± standard deviation.

3. Results

Between 2003 and 2013, 54 patients were operated due to port-site incisional hernia in two surgical centres. No patients were excluded from the study. They were divided into two groups depending on the technique of port-site hernia repair. In 41 patients, fascial defect was sutured (*Suture only group*), whereas in 13 patients a sublay mesh repair was performed (*Mesh repair group*).

35% of the patients were male ($n = 19$) and 65% of the patients were female ($n = 35$). They were distributed equally between the study groups ($p = 0.488$). Mean age at time of operation was 59 ± 17 years without any significant differences between the study groups ($p = 0.564$). Pre-existing comorbidities were distributed equally between both groups, except for cardiac diseases which occurred significantly more often in the *Mesh repair group* than in the *Suture only group* (77% vs. 39%; $p = 0.026$). Furthermore, *body mass index (BMI)* was significantly higher in patients treated with mesh repair (32 ± 9 vs. 27 ± 4; $p = 0.023$) (Table 1).

Concerning the operative details, mean fascial defect size was significantly larger in the *Mesh repair group* than in the *Suture only group* (31 ± 24 mm vs. 24 ± 32 mm; $p = 0.007$). Also mean time of operation was significantly longer in the *Mesh repair group* than in the *Suture only group* (83 ± 47 min vs. 40 ± 28 min; $p < 0.001$). Previous trocar sizes were 10 ± 0 mm in patients treated with sublay mesh and 9.8 ± 1 mm in patients treated by fascial suture ($p = 0.740$). The initial laparoscopic operations which were performed were cholecystectomies (21 patients), diagnostic laparoscopies (8 patients) sigmoid resections (8 patients), fundoplications (7 patients), TAPP procedures (5 patients), appendectomies (4 patients) and one case of gastric resection.

Postoperatively, mean hospital stay was 3 ± 4 days without any differences between study groups ($p = 0.057$). There were no cases of wound infections or surgical complications during in-hospital stay. Hernia recurrence occurred in 9% of the patients without any differences between study groups (7% vs. 10%; $p = 0.653$). Mean time of follow up was 32 ± 35 months in 21 patients (39%). All

Table 1
Demographic data.

	Mesh repair (n = 13)	Suture only (n = 41)	p-value	Total (n = 54)
Age in years	64 ± 11	58 ± 19	0.564	59 ± 17
Gender				
- Male	4 (31%)	15 (37%)	0.488	19 (35%)
- Female	9 (69%)	26 (63%)		35 (65%)
BMI in kg/m^2	32 ± 9	27 ± 4	**0.023**	28 ± 6
ASA classification				
- 1 and 2	8 (62%)	30 (73%)	0.143	38 (70%)
- 3	5 (38%)	11 (27%)		16 (30%)
Diabetes	3 (23%)	3 (7%)	0.143	6 (11%)
Cardiac disease	10 (77%)	16 (39%)	**0.026**	26 (48%)
Pulmonal disease	0 (0%)	2 (5%)	0.573	2 (4%)
History of malignancy	0 (0%)	2 (5%)	0.573	2 (4%)

P-values < 0.05 are considered to be significant. These values are in bold.