A COMPARISON BETWEEN THE USE OF SUCTION DRAINS AND ADHESIVE SUTURES IN THE CORRECTION OF INCISIONAL HERNIAS

Comparação entre o uso de drenos suctores e suturas de adesão na correção de hérnias incisionais

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ABSTRACT

Objective: To evaluate the level of postoperative complications in incisional hernia repairs according to the adjuvant method of wound closure used: adhesive suture or suction drains. **Methods:** This is a retrospective study that compared the outcomes of patients who were submitted to incisional hernia repairs using drains or adhesive suture as adjuvant methods of wound closure. **Results:** of the 75 patients who underwent surgery, 26 were submitted to adhesive sutures, and 8% developed seromas and infections, compared to 45% (p = 0.0013) and 32% (p = 0.0013), respectively, in the drain group. **Conclusion:** adhesive sutures were more effective in preventing postoperative complications of incisional hernia repairs than suction drains, leading to lower morbidity rates and greater patient comfort.

Keywords: Incisional Hernia, Suction, Seroma, Postoperative Complications, Abdominal Wound Closure Techniques.

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INTRODUCTION

Incisional hernias are defined as defects in the abdominal wall adjacent to postoperative scars, which are noticeable or palpable in the clinical or imaging examinations[1]. They occur in 11% of the laparotomy procedures and present several risk factors for their formation, such as malnutrition, obesity, and smoking. They appear, on average, five years after the surgery[2], but they also occur after laparoscopy procedures in up to 2.8% of the cases, with possible higher incidence due to underdiagnosis, as most cases are asymptomatic[3]. Incisional hernias can be classified according to different aspects, such as size, level of contamination, presence of comorbidities and location on the abdominal wall[2,4,5].

Seromas are one of the most common complications after incisional hernia repairs and occur after a major skin and subcutaneous tissue detachment, performed in order to release fascial flaps, or after surgical correction of major skin defects. These situations create room for the tissue fluids to accumulate, overcoming its reabsorption potential. Besides, there are other risks associated with major tissue detachments, such as surgical site infections and hematomas[2,6]. In the case of incisional hernia repairs, in which prostheses are used to reinforce the abdominal wall, the onset of infections may lead to catastrophic outcomes[2,3,6]. Therefore, the prevention of such complications should be a major surgical objective, but the frequent use of drains may increase the risk of such infections[7,8].

Similarly to hernia repairs, the detachments performed in abdominoplasty

procedures are a matter of great concern regarding the onset of postoperative collections, thus stimulating the idealization of techniques such as adhesive sutures, which aim to prevent the formation of dead spaces and reduce the risks of complications[9,10]. Bercial (2012) compared the use of abdominal drains, adhesive sutures and fibrin glue in 43 female patients who underwent conventional abdominoplasty, and did not find statistical differences in the volume of seromas presented in the two first techniques, which suggested the same efficacy for suction drains and adhesive sutures[11]. However, prophylactic drains can be sources of retrograde bacterial migration, may cause local inflammation and prolonged time of use[12]. From the point of view of the patient, drains may lead to more scars, pain, and discomfort, especially during its manipulation, which can be inconvenient[13]. On the other hand, the evolution and standardization of the techniques of adhesive sutures, such as the Progressive Tension Suture[10], improved the functional and aesthetic outcomes of abdominoplasty procedures, which gave room to the possibility of extrapolating the concept in other surgeries with large detachments, such as incisional hernia repairs[14].

Therefore, this study aims at comparing outcomes between the use of suction drains and adhesive sutures regarding postoperative complications, the need for antibiotic therapy and readmission in the follow-up of these patients, in order to investigate the hypothesis that the use of adhesive sutures is equally or more efficient than the use of drains, without the morbidity rates related to the latter.

METHODS

This is a retrospective study based on medical records of patients who underwent surgery to treat incisional hernias from January 2017 to January 2018, at the Fundação Hospital Adriano Jorge (FHAJ), in Manaus, Amazonas, Brazil.

We assessed two groups of patients: those submitted to surgical wound closure with suction drains, and those who received adhesive sutures. We analyzed rates of local complication, outpatient and inpatient reinterventions and readmissions, as well as the need for antibiotic therapy; eventually, comparing these outcomes in both groups.

The adhesive suture technique used was based on that described by Pollock[10] (progressive tension sutures), with the following modifications: lines of continuous 2-0 polyglactin sutures were employed instead of the interrupted 0-0 polyglactin sutures described by that author, in order to reduce the duration of this stage of the surgery. The dermal-fat flaps were attached to the deep fascia, placing the lines of sutures from the most distant point of dissection to the surgical incision, approximately four centimeters apart from each another, always in the craniocaudal direction of the abdomen. The flaps were brought to the incision by the assistant surgeon, so that the sutures could reduce the final tension on the surgery wound. Finally, excess skin that was necessary for the wound closure, without tension of the incision, was excised.

We used 4.8-caliber suction drains, placed by counterincision in the gap between the dermal-fat flap and the aponeurosis of the abdominal muscles, fixated caudally to the incision with 3-0 nylon sutures.

Sample size was estimated considering the mean number of laparotomy procedures carried out at FHAJ, which is 120 per month, and the percentage of incisional hernias resulting from these procedures, estimated at 11% in a study by Speranzini *et al.*[2]. A 95% confidence interval was established, as well as a significance level of 5%, resulting in a minimum sample size of 67 patients according to the statistical parameters and to the formula presented below, described by Fonseca *et al.*[15]:

$$n = \frac{Z^2.\hat{p}.\hat{q}.N}{d^2.(N-1) + Z^2.\hat{p}.\hat{q}}$$

In which:

N: mean number of laparotomy procedures performed in FHAJ each month;
p̂: percentage of incisional hernias as a result of laparotomy procedures;
q̂: percentage of other occurrences caused by laparotomy procedures;
Z: critical value corresponding to the 95% confidence interval (1.96);
d: level of significance (5%)

Data were gathered from medical records using a spreadsheet created for this type of document analysis, compiling the information that was essential for the objectives of this study.

We included only patients whose prior authorization letters, operation notes or notes of outpatient consultations showed incisional hernia repair, in a primary or secondary aspect, from January 2017 to 2018.

Patients aged less than 18 years were excluded from the study, as well as cases of recurrence or those submitted to both techniques evaluated in this study at the same surgical stage. Moreover, we excluded patients whose medical records were incomplete or showed the non-attendance of the patient in postoperative follow-up appointments.

The collected data were grouped in contingency tables, with Microsoft® Office Excel 2013. We divided the groups of patients who were submitted to adhesive sutures or suction drains in the vertical axis of the spreadsheet. In the horizontal axis, patients were distributed according to sex, age group, presence of complications (seroma, infection, hematoma), need for antibiotic therapy, need for outpatient surgical reintervention, need for inpatient surgical reintervention and need for readmission.

Fisher's Exact Test and Student's t-test for independent variables were used for significance analyses. When applicable, the following were calculated: odds ratio, confidence intervals and relative risk reduction.

The study was evaluated and authorized by the Research Ethics Committee - CEP/FHAJ – as required by Resolution n. 466/12 of the Brazilian National Health Council (CNS), which establishes the guidelines for human subjects research in Brazil (CAAE 89676918.6.0000.0007).

RESULTS

From January 2017 to January 2018, 75 patients underwent surgery due to abdominal incisional hernia. However, applying the exclusion criteria, 73 patients remained in the study, which determined an adequate sample size. These hernias were located mostly in the midline, resulting from incisions in the upper abdomen or extending from the xiphoid process to the pubic symphysis. Of note,

five hernias resulted from Pfannenstiel incisions, four of these performed during childbirth, and one for cystolithotomy.

In total, 26 patients were submitted to wound closure employing adhesive sutures, whereas 47 used suction drains. Of the total, 27 patients were male, and seven of these were submitted to adhesive sutures; of the 46 women, 19 had them as a technique of wound closure. Most patients were in their fifth and sixth decades of life.

For hernia defect correction, we used onlay polypropylene mesh in 20 of the 26 cases submitted to wound closure with adhesive sutures, and, in 42 of the 47 patients who received suction drains. In the eleven cases in which the polypropylene mesh was not used, we used meshes composed of polypropylene (parietal side) and polytetrafluorethylene (PTFE) on the visceral side. These cases comprised hernias resulting from midline incisions extending from the xiphoid process to the pubic symphysis, with defects of more than ten centimeters in width. For these patients, we used the component separation technique, placing the mesh in the closure of the posterior layer, as demonstrated in the study by Winder *et al.* (2018)[16]. The anterior abdominal aponeuroses were sutured in the midline, which led to the conclusion of the closure according to the previously described distribution.

In the postoperative period, all analyzed patients reported having used an abdominal binder for at least 30 days after the surgical procedure.

There were no reports of necrosis of the skin flaps or of the neo-umbilicoplasty in the analyzed sample. It is worth to mention there is no consistency in reports about the techniques used for neo-umbilicoplasty or skin flaps used for the closure of cases in which there has been loss of abdominal domain.

The mean time of hospitalization for patients who received adhesive sutures was 2.4 days, whereas in the group with suction drains, it was 5.8 days (p=0.0020; 95%CI 11.71-56.29). Most patients with drains remained hospitalized until their removal and the output in the 24 hours before it was between 32 and 96ml.

As for the complications related to surgery, 23 patients presented with seroma; five, with hematoma; and 23, with surgical site infection (none classified as cavity infection / peritonitis). We considered only complications reported in medical records and/or in notes related to surgical procedures (puncture/aspiration of collections, opening of surgery stitches, among others) performed during the same hospitalization period or in postoperative appointments up to 90 days after hospital discharge.

Of the 23 reported seromas, only two occurred in the adhesive suture group. The five reported hematomas occurred in patients with suction drains. Regarding the surgical site infections, two occurred in the adhesive suture group, one of these was considered a complication from the seroma that had been previously reported. The other 21 were observed in the drain group, being that two of these were described as complications from the reported hematomas, whereas four, as complications from seromas.

In total, antibiotic therapy was necessary for 23 patients (two from the adhesive suture group, and 21 from the drain group), all with favorable outcomes, without associated deaths. The antibiotics varied from cephalexin, in the outpatient setting, to more robust ones, such as meropenem and vancomycin, in the intensive care unit.

As for the need for readmission, a patient from the adhesive suture group needed to be readmitted to treat an episode of reinfection of the surgical site. The report describes the opening of the stitches to drain fluid and for the daily irrigation of the wound with saline solution, associated with intravenous antibiotic therapy for ten days. In the drain group, there were five readmissions: one due to loculated voluminous seroma on the 15th postoperative day, that needed ultrasound-guided aspiration and hospitalization for one day, without new reports of complications during the follow-up period; one due to hematoma, refractory to the opening of isolated surgical stitches in the outpatient setting, followed by cauterization of the bleeding vessel in the operating room, and hospitalization for two days; and three due to infection in the surgical site: one was handled by the opening of surgical stitches and intravenous antibiotic therapy, whereas the other two needed removal of the polypropylene mesh, irrigation of the abdominal wall with saline solution and intravenous antibiotic therapy. Of these patients, the first was hospitalized for seven days, and the other two, for 12 and 6 days, respectively.

Finally, as to the need for new surgeries, three new procedures were performed in the adhesive suture group: one aspiration of the seroma and two openings of surgical stitches for fluid drainage, associated with irrigation of the wound with saline solution. For one of the patients with seroma, expected management was indicated, and the fluid collection was no longer perceived during the follow-up appointment on the 90th postoperative day. In the "drain" group, among the 21 patients with seroma, three needed ultrasound-guided aspiration, one of these being readmitted, whereas the other 18 were submitted to drainage by opening the stitches in the outpatient setting. Also in this group, of the five hematomas, one needed cauterization of the bleeding vessel in the operating room, and the others were submitted to drainage by opening the surgical stitches in the outpatient setting. Finally, of the 21 surgical site infections in this group, 19 were handled with the opening of surgical stitches and drainage, one of these in the inpatient setting, whereas two needed to remove the mesh and to irrigate the abdominal wall with saline solution in the operating room.

After the analysis of the data, only the onset of seroma and the need for antibiotic therapy showed statistically significant differences in favor of the use of adhesive sutures, as observed in Table 1.

DISCUSSION

Incisional hernia repair is a complex procedure, with high rates of recurrence and locoregional complications[17,18], reaching up to 32% in some cases, as described in the literature[19]. In our sample, there were complications in 50.6% of the patients, which is high in comparison to other studies[6,17,20]. This fact can be partially attributed to the routine use of mesh[21,22,23] and the level of complexity of the hernias referred to surgery in the study site[6], which is a reference center in the region for the tertiary treatment of this pathology.

Among the local complications, seroma is one of the most common ones, followed by hematomas and infec-

TABLE 1 - Comparison between the incidence of complications in the adhesive suture group and the drain group.

CHARACTERISTICS	SUTURES		DRAINS		TOTAL	RRR#	*p**	*CI 95%°*
	n	%	n	%				
Seroma								
Yes	2	7,7	21	44,7	23	82,8%	0,0013	0,02-0,49
No	24	92,3	26	55,3	50			
Hematoma								
Yes	0	0,0	5	10,6	5	100%	0,1533	-
No	26	100,0	42	89,4	68			
Need for antibiotics								
Yes	2	7,7	21	44,7	23	82,8%	0,0013	0,02-0,49
No	24	92,3	26	55,3	50			
Readmissions								
Yes	1	3,8	5	10,6	6	64,0%	0,4118	0,04-3,04
No	25	96,2	42	89,4	67			
Reinterventions$^{\Delta}$								
Yes	3	11,5	6	12,8	9	11,0%	1,0000	0,02-3,9
No	24	88,5	41	87,2	64			

Relative Risk Reduction

* P-values are significant if <.05 (5%)

° 95% Confidence Interval

$^{\Delta}$Excluding cases in which only simple opening of stitches in the outpatient setting were needed for fluid drainage

tions[3,7,24]. In this study, the incidence of seroma (22.7%) was compatible with that of other studies[3,21,24,25]. However, the statistically significant difference we found in favor of adhesive sutures suggests them as a better alternative in this sample.

Besides, in the incidence of surgical site infections, there was also a significant difference, once again, favoring the adhesive suture group, similarly to what is observed in abdominoplasty procedures, for example, in which detachment is also frequent[8,25,26]. Moreover, there is evidence showing that drains can have the opposite effect, that is, may even increase the risk of surgical site infection[17].

Concerning the prevention of hematomas, even though there was no occurrence in the adhesive suture group, the lack of statistical significance, in comparison to the drain group, suggests an equivalence between the techniques, as also observed in the study by Seretis *et al.*[26].

It is important to mention that, as observed in other studies[6,7,26], the total time of hospitalization was shorter for patients who used adhesive sutures, in comparison to those who used suction drains, which possibly reduces costs. Even if only the duration of the first hospitalization was analyzed in this study, this difference was significant and may have an impact if applied on a large-scale.

However, as limitations of this study, it is necessary to mention there were cases of complications handled conservatively. Besides, no routine diagnostic imaging was performed to detect collections postoperatively. This may lead to the underdiagnosis of these complications, despite being rational from the clinical care point of view. Therefore, it is important to mention that the data regarding the complications are only related to the clinical diagnosis based on the morbidity caused to the patients, which may underestimate the real prevalence of complications in both groups. Besides, the variety in the presentation of incisional hernias as to size, shape, time of evolution, position on the abdominal wall and factors related to their onset can change the evolution and outcome of the incisional hernia repair, regardless of the adjuvant technique used for wound closure. Therefore, it is necessary to perform other studies and further analyses of the presented findings.

CONCLUSION

In this study, the adhesive sutures were more efficient to prevent postoperative complications after incisional hernia repair, with lower rates of seroma and postoperative infections than those patients handled with suction drains. Considering the reduction in the number of scars, the discomfort inherent to the presence of a drain and the negative consequences that may come from maintaining it, it is possible to suggest that the use of adhesive sutures is equivalent to or better than the use of suction drains in the wound clousure of incisional hernia repairs, and can be a substitute for them.

DISCLOSURES

There is no conflict of interests to declare.

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