

Myofascial Release in the Management of Incisional Hernia on ICU Survivors.

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Abstract

Introduction. This is a subgroup of critically ill patients with open abdomen with or without a stoma who survived intensive care unit (ICU). In common, they had multiple relook laparotomies that resulted in an open abdomen. A temporary vicryl mesh was used to bridge the defect which was subsequently covered with a split skin graft. Months later, myofascial release was used to repair the hernia.

Objective. To evaluate the use of myofascial release in the management of large incisional hernia on ICU survivors.

Methods. Records of ICU survivors who had myofascial release repair of abdominal wall defects between January 2006 and December 2011 at Chris Hani Baragwanath Academic Hospital (CHBAH) were reviewed. Data retrieved included patient demographics, indication for the initial operation, procedures performed, post-operative complications, early and long term recurrence.

Results. There were 15 patients. 13 male and 2 female, mean age 40.9 years. There were 9 trauma and 6 general surgery cases. There was no 30 days recurrence and no 30 days mortality. 6 patients had hernia associated with stoma. There were 4 cases of wound sepsis of which one required debridement and one patient with a controlled fistula treated conservatively. 7 patients were lost to follow up. Of the remaining 8 cases; 5 (62.5%) had no recurrence after a mean follow up of 52 months (41-80), two died from unrelated conditions and one (12.5%) had recurrence within 36 months.

Conclusion. Myofascial release was able to cover large defects with satisfactory long term results. It was appropriate as one stage procedure in complex cases associated with stoma.

I. Introduction

Incisional hernia is one of the most common late complications of laparotomy (2-20%)^{1,2}. It represents a major health issue considering the negative psycho-socio-economic implications: depression, social withdrawal, absenteeism from work and school, loss of skilled labour and potential professionals. With the advance in critical care, a lot more patients are surviving and become candidate for elective incisional hernia repair. This particular group of patients does not represent an abdominal wall failure post laparotomy but rather consists of a subgroup of critically ill patients who had multiple relook laparotomies for intra-abdominal sepsis post trauma or other surgical pathologies. Subsequently the open abdomen was temporarily covered with vicryl mesh followed later by a split skin graft. Approximately a year later, the patients were readmitted for a combined repair of the abdominal wall defect and reversal of stoma where applicable. They all invariably had a large defect due to the retraction of the abdominal wall myofascial complex. Therefore tissue repair, considered unsuitable in this exceptional situation, yielded to novel modalities (synthetic and biologic implants) which come at a higher cost and have their own shortcomings namely sepsis, fistula, bowel obstruction, mesh extrusion, recurrence and inaccessibility due to cost. In a Randomized Controlled trial by Jacobus W.A. Burger et al^{3,4}, after a 10 years follow-up, one third of the mesh repair recurred versus two third of tissue repair. This emphasizes the limitation of tissue repair (applicable to smaller defect) and underscores the fact that implants do fail as well. Myofascial release is an old technique that is available around the world and does not require alloplastic materials. Myofascial release provides a relatively tension free repair, but its use has largely been eclipsed by the newer modalities. This subset of patients faces more challenges ahead when they are considered for abdominal wall reconstruction with its associated morbidity and mortality. Myofascial release involves the division of either the rectus sheath or the external oblique aponeurosis tailored to the defect in order to allow the tension free slide of the rectus muscle medially (fig.1).



Fig. 1. Technique of myofascial release. 1a. pre-operative. 1b. previous skin graft excised. 1c. myofascial release. 1d. Fascia and skin closure

The integrity of the abdominal wall is indispensable to protect the intra-abdominal organs, to support the spine, to facilitate ambulation and to generate valsalva indispensable for defecation, urination and child birth. It will be very frightening for these patients to suffer another complication after surviving the initial injuries and ICU admission; therefore the choice of technique is very important to determine a favorable outcome.

Available options includes:

1. Tissue repair. Completely irrelevant in incisional hernia with larger defect. Tissue repair is still used for smaller defect (< 3 cm)⁵ and is also applicable in closing certain open abdomen post multiple relook laparotomy once the oedema has resolved significantly to allow secondary closure.
2. Synthetic implant. The synthetics have revolutionized the management of incisional hernia but special mention should be made regarding their complications which is lifelong and can be very challenging and costly^{6,7}. It involves the use of alloplastic materials to reinforce the abdominal wall. Synthetics are contraindicated in the presence of contaminated or septic wounds and is best avoided in clean contaminated wound⁸. The best indication is therefore a clean wound in a patient with low risk for surgical site infection. Likewise, it is debatable whether to use synthetics in a procedure that involves enterotomy. Synthetics can not be placed directly onto bowel to avoid adhesions. This has led to the manufacturing of dual implants with a smooth surface in contact with bowel. Progress in technology has led to the development of macroporous, light weight implants that favour good tissue integration and minimize sepsis but at the expense of tensile strength⁹. Synthetics are suitable to bridge a full thickness defect after tumour excision¹⁰.
3. Biologic implants. New modality that allows procurement and preparation of biologics (xenograft or homograft) to address the side effect of the synthetics although at very high cost. Long term follow up is needed to assess their effectiveness. Being a biological tissue, they suffer the effect of proteolytic enzymes (Proteases, collagenase) that may result in weakness with time¹¹. Biologics are not good for bridging the defect alone for they stretch and result in eventration.
4. Component separation. Initially described by Ramirez in 1990. It provides a tension free repair. Component separation is a complex procedure that may be associated with the risk of lateral herniation. Currently it is often combined with synthetic or biological implants¹². It is a difficult procedure that requires special training and in-depth knowledge of abdominal wall anatomy to minimize the risk of devascularizing and denervating the abdominal wall musculature.
5. Myofascial release. Myofascial release has been available since the 1970s and appears to have been forgotten nowadays. Currently there are fewer publications about this technique.^{13,14}

Objective

To evaluate the use of myofascial release in the management of large incisional hernia on a subset of critically ill patients who survived ICU after multiple relook laparotomies

II. Methods

Review of data collected between January 2006 and December 2011 on ICU survivors with incisional hernia bridged by a temporary skin graft. Data included patient demographics, indication for the initial operation, BMI (body mass index), procedures performed, post-operative complications, early recurrence (within 30 days), long term follow up. Ethic approval for the study was obtained from the Human Ethics Committee of the University of the Witwatersrand.

Statistical analysis

Observational descriptive study. Mean was used for continuous data and proportion by ratio or percentage for categorical data.

III. Results

The demographics of the patients are depicted in table 1.9 patients had isolated hernia (fig.1) and 6 patients had complex hernia (defect associated with stoma) (fig.2) treated in one stage. There were 9 trauma (6 gunshot, one stab, one pedestrian vehicle accident and one motor vehicle accident) and 6 surgical patients (three appendicitis, one strangulated umbilical hernia, one pancreatic pseudocyst, one left hemicolectomy for unknown cause). The mean time to repair after discharge from the initial injury was 18.5 months (9-36). There were no 30 days recurrence, no 30 days mortality and no ICU admission. There were 3 surgical site infections (SSI) and one controlled enterocutaneous fistula treated conservatively. 7 patients were lost to follow up. Of the remaining 8 cases (table 2), 5 (62.5%) had no recurrence after a mean follow up of 52 months (41-80). Two patients died after 9 and 18 months from unrelated conditions. One patient (12.5%) with high BMI (37.6) had a recurrence within 36 months

Table 1. Patient demographics (N=15)

Male	13
Female	2
Male: female ratio	6.5: 1
Mean age, n (years), range	40.9 (20-62)
Black, n (%)	13 (86.6)



Fig.2. Complex hernia associated with stoma. 2a. Pre-operative (ileostomy noted). 2b. Post operative after bilateral myofascial release

Table 2. Patients' characteristics and long term follow up.

Age/ Gender	Initial diagnosis	Procedure associated with myofascial release	Time to repair (month)	BMI	complication	Recurrence free (month)
48 M	Gunshot abdomen	Closure of ileostomy	12	24.2	Nil	50
50 M	appendicitis	Nil	15	29.2	SSI	80
62 M	Gunshot abdomen	Nil	20	37.6	Nil	Recurred within 36 months
20 M	Stab abdomen	Closure of Ileostomy	10	22.4	Enterocutaneous fistula	48
41 M	Gunshot abdomen	nil	30	24	nil	41
33 M	appendicitis	nil	33	36.7	nil	41

M: male.

IV. Discussion

The incisional hernia in this study was not a late complication post laparotomy. Therefore patient related factors (smoking, obesity, diabetes, poor collagen) that result in hernia formation may not necessarily apply in this

context. Likewise primary tissue repair has no role and the defects are invariably large. Therefore myofascial release was adopted in all of these patients unless contraindicated. The advantages and disadvantages of this option are worth mentioning.

Advantage

The abdominal wall closure was achieved in all cases. This is important because the midline fascial reapproximation is essential in the repair of incisional hernia in order to expect a favorable outcome¹⁵. Post-operative morbidity was mainly SSI. There was no mortality associated with the procedure. No patient required readmission to ICU.

The long term follow up was encouraging. The one recurrence was associated with a high BMI.

The technique of myofascial release is very appealing in this time of economic challenge especially in developing countries where alloplastic materials may not be readily available. There are less concerns about the dreaded complications of the synthetic implants that represent a permanent risk. In our practice we treated a patient with mesh sepsis and fistula 21 years after the initial procedure. More recently three additional patients presented to the outpatient department with fistula long after surgery (6 to 8 years).

Moreover, myofascial release represents a suitable option in women of reproductive age who envision more pregnancies and who may require a caesarian section at delivery. The synthetics in this situation will be less attractive considering on one hand the gradual abdominal distension of pregnancy in the presence of an implant which is prone to shrinkage and on the other hand the anticipated challenge to perform a caesarian section in the presence of extensive adhesions in response to a foreign body. Similarly an implant recipient who undergoes an emergency laparotomy may face the same access challenge.

We believe myofascial release bridges the gap between primary tissue repair applicable for smaller defect (<3cm) and the implants.

Myofascial release was of the utmost benefit in complex hernia associated with stoma (fig.2). It permitted a one stage procedure whereas the synthetics would have been best avoided in the presence of a contaminated field unless a two stages approach is considered.

Disadvantage

However myofascial release is subjected to some limitations related to the patient. Poor quality myofascial complex, very large defect that precludes midline fascia approximation. We did not measure the defect in our study although we did know that they were very large for primary closure. It would have been better to have the defect sized to predict the suitable case for myofascial release. The shortcoming of the myofascial release can also be remedied with prior insufflation to expand the abdominal wall especially in case of loss of domain¹⁶. In the worst case scenario consideration should be given to conservative management because of the poorer outcome in redo surgery after multiple recurrences¹⁷.

This study is limited by the small number of patients but nevertheless it emphasizes the need to consider all available options in this challenging field of worse case scenarios of abdominal wall defect.

V. Conclusion

In this subset of patients who survived ICU after multiple relook laparotomies, Myofascial release was able to cover large abdominal wall defect with satisfactory early and long term follow up. It provided a one stage approach in complex hernias associated with stoma. Myofascial release should be considered a viable alternative especially where implants are not available or contraindicated.

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