

Plug-technique for small incisional hernia



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Introduction

Incisional hernias develop in 1-15% of cases after abdominal surgery (1). Ninety per cent occur within 3 years of operation (15). Women are more commonly affected especially following gynecological and obstetric operations (5). Risk factors include poor surgical technique, excessive tension on the suture line, wound infection, age, steroids, obesity, chronic obstructive pulmonary disease, connective tissue disorders, diabetes (10, 13, 17). The use of a prosthetic material to repair large incisional hernias is well established, while it is still disputed in small defects which are commonly repaired by direct suture (21).

The authors report their experience with a plug-technique for the repair of incisional hernias with defects smaller than 3 cm and emphasize the advantage of the use of local anaesthesia.

Materials and methods

From January 1995 to September 2002, 16 operations were carried out for incisional hernias with defects smaller than 3 cm. Of the 16 patients, 8 were males and 8 females with a median age of 61 years (range 40-83). An ultrasound scan of the abdominal wall was obtained in all patients to measure the size of the defect and

Abstract

Objective: *The authors report their experience with a new prosthetic technique for the repair of incisional hernia defects smaller than 3 cm.*

Methods: *From January 1995 to September 2002, 16 operations for small incisional hernias have been performed. Local anaesthesia was used in 12 out of 16 patients (75%). The repair was achieved by insertion of a polypropylene plug sutured to the margins of the hernial defect.*

Results: *All patients were discharged within 24 hours of surgery. Postoperative pain was mild and required hospital analgesia in 25% of cases. Back at home analgesia was needed in only 1 patient. During a follow-up ranging 3 to 91 months (mean 46), no recurrence has been recorded.*

Conclusion: *The proposed technique allows a sound repair of small incisional hernias with minimal pain, quick rehabilitation and early return to unrestricted work.*

Key words: Incisional hernia, plug, tension free.

Riassunto

PLUG-TECHNIQUE PER I PICCOLI LAPAROCELI

Obiettivo: *Gli Autori riportano la loro esperienza con una originale tecnica protesica per la riparazione dei laparoceli con difetto inferiore a 3 cm.*

Materiali e Metodi: *Dal gennaio 1995 al Settembre 2002, sono stati effettuati 16 interventi per laparoceli di piccole dimensioni. L'anestesia locale è stata utilizzata in 12 dei 16 pazienti (75%). La riparazione è stata ottenuta mediante un plug di polipropilene suturato ai margini della porta erniaria.*

Risultati: *Tutti i pazienti sono stati dimessi entro 24 ore dall'intervento chirurgico. Il dolore postoperatorio è stato di lieve entità ed ha richiesto la somministrazione ospedaliera di analgesico nel 25% dei casi. Soltanto un paziente ha assunto analgesici a domicilio. Durante un follow-up compreso tra 3 e 91 mesi, non è stata riscontrata alcuna recidiva.*

Conclusioni: *La tecnica proposta consente una valida riparazione dei piccoli laparoceli con una riabilitazione immediata, minimo discomfort ed un precoce ripresa delle normali attività.*

Parole chiave: Laparocelce, plug, tension free.

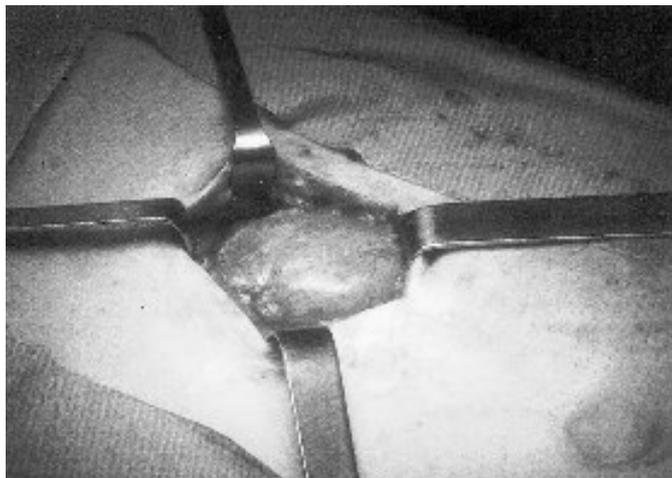


Fig. 1a: Midline incisional hernia.

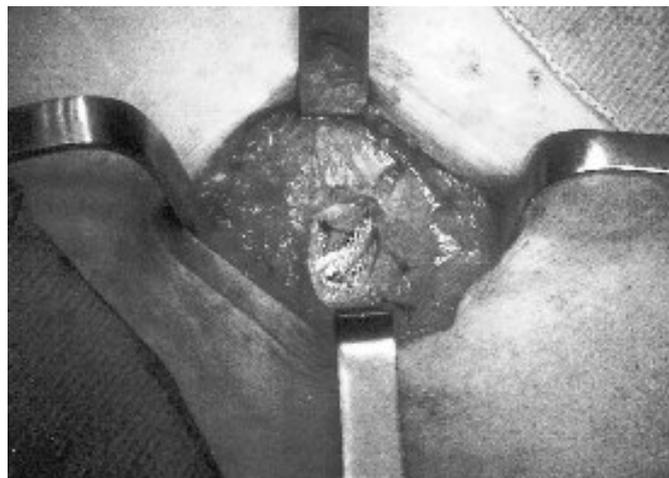


Fig. 1b: Incisional hernia: small defect repaired with a plug.

exclude the presence of associated secondary hernias. Primary operation was bowel related in 12 patients, gynaecological in 1, cardiac in 1 and urological in 1 patient. The original incisions were midline in 12 patients and transverse in 4. Six patients (37.5%) required an adequate preoperative assessment and treatment for associated cardiorespiratory diseases. Local anaesthesia was used in 12 out of 16 patients (75%) and a visual analog scale (0-10) was used to assess intraoperative pain. All patients were given antibiotic prophylaxis in the form of 1 gram of ceftriaxone. After skin preparation and draping, the cutaneous scar overlying the hernia was excised and the sac dissected to expose the circumference of the abdominal wall defect (Fig. 1a). The sac was simply inverted into the abdomen with a plug fashioned from a square of polypropylene of about 5 cm, shaped like a dart with four wings. The plug was sutured to the margins of the defect with a series of mattress 2/0 polypropylene sutures (Fig. 1b). After accurate haemostasis, the skin was closed with absorbable subcuticular suture. When local anaesthesia was used, the repair was assessed by asking the patient to cough or perform Valsalva manoeuvre.

Results

The 12 patients operated on under local were up and about straightaway after surgery, had a light meal shortly afterwards and were discharged within one day of operation. Analogue measurement of intraoperative discomfort resulted in a mean score of 1.9 (range 0-2.9). Postoperative pain was never severe and required parenteral analgesia (ketoralac 30 mg) in 4 out of 16 patients (25%) during the short period of hospitalization. Similarly, back at home analgesia in the form of 3 tablets of ketoralac was needed in only 1 patient. There were no postoperative complications except for 1 wound infection that resolved with conservative treatment within the

fifteenth postoperative day. Patients were included in a follow-up protocol with examinations at 3, 6 months and 1 year, and with a yearly telephone questionnaire thereafter. During a 3 months to 91 month follow-up (mean 46 months), no recurrence has been recorded.

Discussion

Incisional hernia is the most frequent late complication of surgery; its incidence is constant and it has a high socio-economic impact (1). It has been proved that continuous mattress suturing after laparotomy produces a better wound healing, shorter operating times and smaller amounts of suture needed. Suture length-to-wound length ratio of at least 4:1 is superior to single interrupted suturing because of better bio-mechanical properties and increased collagen synthesis in the region of the incision (8). Slowly absorbable continuous sutures appear to be the optimal method of fascial closure (20). Numerous methods of repair have been described: primary repair in one or two layers or Mayo-type overlap, use of fascia (local or flaps) with suture darns, and recently the use of synthetic mesh (polypropylene or Marlex mesh, stainless steel, mersilene or expanded polytetrafluoroethylene) (11, 14).

Sutures repair are currently used mainly to repair small incisional hernia defects. These techniques are based on muscular and fascial reconstructive surgery. Simple suturing of the aponeurotic margins after reduction of the herniated viscera and treatment of the hernial sac, may be useful when the orifice is narrow, e.g., incisional hernia at a drainage site (16). Suturing by Judd's technique is used in minor forms of incisional hernia or when sepsis is present. It requires that the aponeuroses be solid. Furthermore, it is necessary that these fascial structures be stretched and that the margins of the orifice be brought into apposition without difficulty (7). Reference is often made by French authors to the technique of Welti and

Eudel which is used for midline incisional hernia repair and consists of making two lateral incisions (parallel to the midline) through the anterior surface of the rectus sheath. The two resulting aponeurotic flaps are then sutured together over the midline defect. Finally, the medial margins of the rectus sheath are sutured together over the aponeurotic repair (9, 16). Unfortunately suture repairs create excessive tension on the suture line with consequent unacceptable recurrence rate reported as high as 31-49 per cent (12, 18). The recent widespread use of prosthetic material has changed the approach to incisional hernia repair. Results of open mesh and laparoscopic mesh techniques are encouraging with recurrence rates between 0 and 10 per cent (4).

There is an unfortunate tendency on the part of both surgeon and patient to procrastinate operation. This tendency is usually less pronounced if the surgeon was not the original operator. Once an incisional hernia develops, however, it inevitably enlarges, repair becomes more difficult and complications including incarceration, obstruction, strangulation with perforation may occur (12). Incisional hernias should therefore be repaired when the defect is of small size.

The authors have employed the concept of "tension-free repair" also in the treatment of small incisional hernia defects. Monofilament polypropylene fulfills all the requirements for a proper mesh: inertness, resistance to infection, rapid fibrinous fixation and host incorporation (6). The plug, beside reducing the sac and closing the defect is an effective means of stimulating an ingrowth of strong fibrous tissue. The wings of the plug extend beyond the margins of the defect in the preperitoneum, thus reducing tension on the suture line and consequently postoperative pain. Local anaesthesia is well tolerated by patients as demonstrated by the low mean score (1, 9) resulted from the visual analogic evaluation of intraoperative discomfort. During intraoperative stress test to assess the soundness of repair, it is interesting to note that the lines of force unaffected by the plug, cause a narrowing of the defect, thus contributing to the repair. Effectiveness of plug techniques has also been shown in the treatment of small epigastric and paraumbilical defects (2, 3).

The authors used antibiotic prophylaxis which has been showed to be effective to reduce local septic complications in abdominal incisional hernia surgery with implantation of prosthetic material (19). The only infection reported did not require removal of the plug and had quick complete resolution.

Conclusions

The proposed technique is simple, safe and absolutely effective. The use of prosthetic material and reduction of tension on the suture line allow a sound repair with low risk of complications and a recurrence rate which is

null in the authors' experience, though after a short follow-up. Besides, the use of local anaesthesia allows patients with severe comorbidity to undergo early surgery and provides immediate rehabilitation with early return to unrestricted activities.

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Commento

Commentary

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Gli Autori affrontano un problema di notevole interesse ed attualità, in relazione alla sempre maggiore diffusione delle tecniche protesiche nel trattamento chirurgico dei difetti della parete addominale. La riparazione dei piccoli laparoceli mediante l'impiego di plug, rappresenta un aspetto originale ed innovativo della tecnica proposta dagli Autori. Le tecniche tradizionali di sutura diretta presentano un'incidenza di recidiva inaccettabile, che è per lo più da riferire all'eccessiva tensione sulla linea di sutura e all'utilizzo di strutture muscolo-fasciali che presentano di per sé una scarsa resistenza. L'utilizzo di materiale protesico consente una notevole riduzione della tensione e induce una risposta fibroblastica che è in grado di ricostruire una solida parete. Inoltre, l'uso dell'anestesia locale, ben tollerata nei laparoceli di piccole dimensioni, permette anche una valutazione intra-operatoria della riparazione. Tale approccio mini-invasivo consente infine una riabilitazione immediata con riduzione del dolore postoperatorio, dimissione precoce (day surgery) e riduzione dell'incidenza di recidiva (assente nella casistica presentata).

The authors discuss a topic of great interest in consideration of the wide spread use of prosthetic techniques in the surgical treatment of abdominal wall defects. The repair of small incisional hernias with a plug is an original and innovative feature of the technique proposed by the authors. Traditional suture repairs have an unacceptable incidence of recurrences which is mainly due to the excessive tension on the suture line and to the use of muscular and fascial structures with inherent poor resistance. The use of prosthetic materials allows a considerable reduction of tension and induces a fibroblastic reaction which is able to reconstruct a sound wall. Besides, local anaesthesia is well tolerated during repair of small incisional hernias and allows intraoperative evaluation of the soundness of repair. This miniminvasive approach allows immediate rehabilitation with reduction of postoperative pain, early discharge (day surgery) and reduction of recurrence rate (null in the authors' series).

Commento

Commentary

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La riparazione protesica con plug di piccoli laparoceli quale quella proposta dagli Autori presenta indubbiamente aspetti interessanti sotto diversi punti di vista. Innanzitutto la possibilità di procedere in anestesia locale, con le possibilità di verifica intraoperatoria della tenuta sotto sforzo e la dimissione precoce sono vantaggi indubbi. La condizione per procedere in questo senso è peraltro rappresentata dalla possibilità di accedere in maniera soddisfacente al peritoneo senza aprire il sacco peritoneale. L'alternativa dell'apertura del peritoneo per procedere alla lisi delle aderenze crea invece qualche problema anche nei confronti dell'opportunità di procedere in anestesia locale. Sarebbe stato interessante sapere per tutti i casi trattati se la precedente laparotomia era stata suturata in più piani o in stato unico, se in continuo rispettando il rapporto 4:1 o a punti staccati e non ultimo il tipo di filo di sutura impiegato, per consolidare le conoscenze etiopatogenetiche.

La riparazione con plug richiede certamente non solo l'adozione della profilassi antibiotica ma anche una tecnica altamente asettica. Ulteriore metodo profilattico, valido nel caso di impiego di ogni tipo di protesi, è l'adozione di una copertura antibiotica prolungata con penicillina deposito.

The prosthetic plug repair of an incisional hernia of limited extension, as that of the Authors, shows sure interesting points under several aspects. First of all the possibility of proceeding in local anesthesia, with the possibility of an intraoperative stretch test and a very short hospital stay, are undebatable advantages. The condition to perform such procedure is represented by the possibility of an easy access to the properitoneum without penetrating the peritoneal sac.

In case of necessity of opening the peritoneal sac on the contrary to perform an adhesiolysis such procedure becomes not so advisable also in consideration of the local anesthesia.

It could be interesting to know all the observed and treated cases if the proceeding laparotomy has been sutured in one or more layers, with a continuous running suture respecting the 4:1 ratio or by single e stitches and lastly the kind of suture material to consolidate over etiopathogenic knowledge on the topic. The plug repair needs not only the antibiotic prophylaxis strategy but anyway a strict aseptic technique. Moreover, as in every case of using prosthetic materials, it is advisable to make a lasting prophylaxis with slow acting penicillina.

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