

Nuttall technique: A method for subumbilical incisional hernia repair revised

Antonios-Apostolos K. Tentes ·
Athanasios I. Xanthoulis · Charalambos G. Mirelis ·
Ioannis G. Bougioukas · Evanthia G. Tsalkidou ·
Konstantina A. Bekiaridou · Odysseas S. Korakianitis

Received: 6 January 2007 / Accepted: 7 August 2007 / Published online: 14 September 2007
© Springer-Verlag 2007

Abstract

Background Large ventral incisional hernias are frequently repaired either by open or by laparoscopic mesh technique. The technique recommended by Nuttall has been used for the repair of large subumbilical incisional hernias but has not been popularized.

Materials and methods From 1991 to 2005, 21 patients, mean age 64.6 ± 13 (44–86) years, underwent repair of large subumbilical incisional hernia with the Nuttall technique by which the rectus muscles are detached from the symphysis pubis and transposed to the opposite side. The exerted tension is minimal to the underlying tissues, and no prosthetic material is required to reinforce the abdominal wall.

Results Morbidity was recorded in five patients (23.8%). The median follow-up time was 84 months, and the recurrence rate was 4.8% (one patient).

Conclusions Although a small number of patients have undergone repair with the Nuttall technique, the long-term results of the method seem to be encouraging for the repair of large subumbilical incisional hernias.

Keywords Subumbilical incisional hernia ·
Hernia repair · Nuttall technique

Introduction

The use of mesh for the repair of ventral incisional hernia has been the method of choice for the last three decades [1, 2]. Laparoscopic techniques are being increasingly used and offer shorter hospital stay, decreased wound complications, and possibly lower recurrence rate [3–5]. The recurrence rate has not been generally possible to be decreased below 5% despite improvements in quality of prosthetic material [6]. More recently, the development of mesh that is safe to be placed intraperitoneally has made possible the recurrence rate to drop slightly under 5% [1, 7].

About 70 years ago, Nuttall recommended the “transplantation” of the abdominal rectus muscle for the repair of subumbilical incisional hernias, but the method was not popularized [8].

The purpose of the study is to review the long-term results of patients that underwent repair of subumbilical incisional hernias with the Nuttall technique.

Materials and methods

The files of the patients with subumbilical incisional hernias that underwent repair with the Nuttall technique were retrospectively reviewed. The method was used for patients with hernia orifice greater than 7 cm. The age, gender, American Society of Anesthesiologists (ASA) class, prior surgery, morbidity, the use of steroids or other drugs, severe coexisting diseases, smoking, body weight, and hospital stay were recorded. All the patients have been reassessed as outpatients with physical examination, and the postoperative problems have been recorded. The reassessment was made at the second and sixth month after surgery and then in 2-year intervals.

A.-A. K. Tentes (✉) · A. I. Xanthoulis · C. G. Mirelis ·
I. G. Bougioukas · E. G. Tsalkidou · K. A. Bekiaridou
Surgical Department, Didimotichon General Hospital,
Didimotichon 68300, Greece
e-mail: atentes@did-hosp.gr

O. S. Korakianitis
Department of Anesthesiology, Didimotichon General Hospital,
Didimotichon, Greece

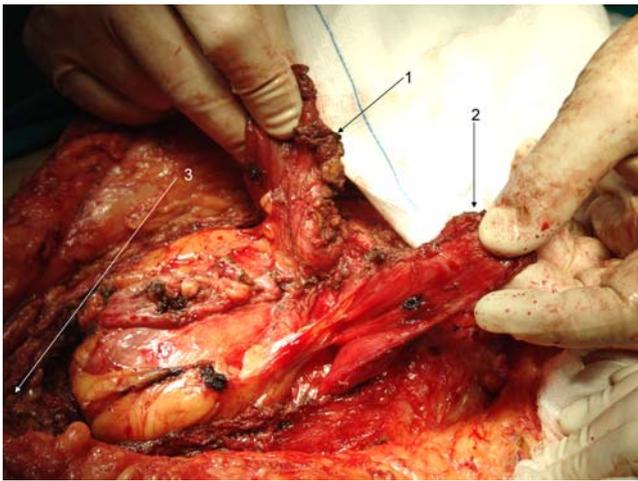


Fig. 1 The right (arrow 1) and left (arrow 2) rectus muscles are detached from the symphysis pubis (arrow 3)

Surgical technique

A vertical midline incision was used for exposure that was extended below to the symphysis pubis. The skin and fat were reflected on either side for an adequate distance to expose the lower halves of the rectus muscles and their sheaths. The sac was opened, any redundant intraperitoneal structure was detached from the sac, and the edges of the mobilized peritoneum were sutured. The rectus sheath was incised longitudinally on each side. The sheaths were mobilized and retracted laterally to expose the outer border of the muscles and the tendinous portions of the rectus muscles from the symphysis pubis. The rectus muscles were then detached from the symphysis pubis as close as possible to the bone without damaging the nerve and blood supply (Fig. 1). The peritoneum was closed with continuous suture (Dexon or Vicryl no. 0). The tendons of the rectus muscles were transposed to the opposite of the pubis

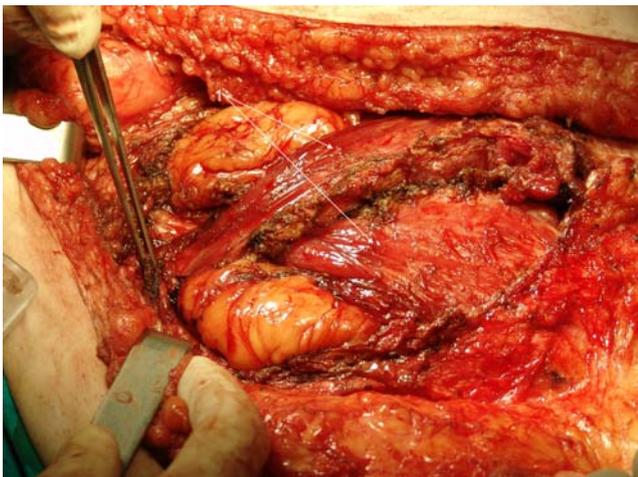


Fig. 2 The rectus muscles (arrows) are transposed to the opposite of the pubis and sutured to the ligaments and fibrous tissues with interrupted sutures. The forceps indicate the symphysis pubis

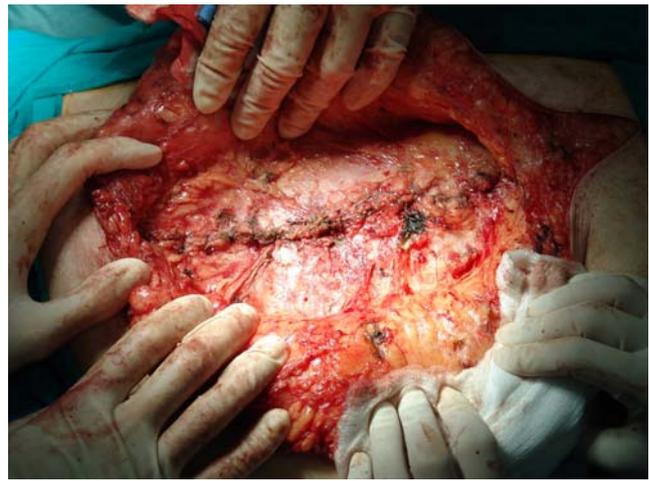


Fig. 3 The operation is completed. Interrupted sutures bring together the aponeurotic sheaths on either side

and sutured to the ligaments and fibrous tissue with interrupted sutures (silk no 2–0; Fig. 2). Interrupted sutures (silk no. 2–0) brought together the edges of the aponeurotic sheaths on either side (Fig. 3). The anterior sheath of the rectus muscle was closed with interrupted sutures Dexon or Vicryl no. 0.

Results

The data of 21 patients, mean age 64.6 ± 13 (44–86) years, that underwent repair of subumbilical hernia with the Nuttall technique from 1991 to 2005 were retrospectively reviewed. The majority of patients were women (85.7%) and were classified as ASA I. One patient used steroids for bronchial asthma, and five patients had insulin-dependent diabetes (Table 1). One patient was heavy smoker (>20 cigarettes per day), and seven patients were overweight

Table 1 Patient's characteristics

	Number of patients	Percent
Gender		
Male	3	14.3
Female	18	85.7
ASA class		
I	14	66.7
II	7	33.3
Coexisting diseases		
Bronchial asthma	1	4.8
Diabetes	5	23.8
Morbidity		
Wound seroma	4	19
Pulmonary insufficiency	1	4.8
Hernia recurrence	1	4.8

(body mass index=27–29 kg/m²). In 13 patients (61.9%), the hernia was the result of a previously performed gynecologic operation; in seven patients (33.3%), it was the result of gastrointestinal surgery, and in one patient (4.8%), it was the result of a previously repaired ventral hernia with simple suturing. The mean size of the hernia orifice was 9.1 cm (7–12.3 cm). Five patients (23.8%) had mild postoperative complications, four had wound seromas, and one had mild pulmonary insufficiency. The mean hospital stay was 7 (4–15) days.

The median follow-up time was 84 months (12–176). All the patients were found to have normal abdominal wall function during reassessment. Recurrence was recorded in one patient (4.8%) who used steroids for bronchial asthma.

Discussion

The repair of ventral hernias with simple suturing has almost been abandoned because even a fourfold higher recurrence rate has been reported after suture than after mesh repair [2]. The recurrence rate is generally 24–63% with simple suturing technique and 13–29% when open mesh is used [9–11]. The intraperitoneal use of prosthetic mesh has made possible the recurrence rate to drop slightly under 5% [1] but with a higher morbidity rate than after extraperitoneal placement of mesh [7]. The mesh repair is not recommended for hernias with small orifice (<4 cm) because the number of recurrences is the same as in simple suturing technique [12] but is strongly recommended in hernias with large orifice as well as in overweight patients [9].

Laparoscopic hernia repair has been increasingly used over the last 15 years. A meta-analysis has shown that there is no difference in operative time between laparoscopic and open repair. The laparoscopic repair seems to be associated with a lower complication rate and a shorter hospital stay [5]. However, the long-term results of laparoscopic repair have not still been definitely confirmed and prospective randomized trials are required for this. It is obvious that the ideal method for ventral hernia repair has not been invented.

Most of the predisposing factors for incisional ventral hernia are patient related [1]. The main factors of hernia recurrence are (1) tissue tension, (2) wound infection, (3) the diameter of the hernia sac, (4) smoking, and (5) the use of steroids [6, 10]. It is likely that the tissue tension is the most significant predisposing factor.

Nuttall described a technique for the repair of large subumbilical incisional hernias that exerts a minimum tension on the abdominal wall [8]. Theoretically, the technique is expected to be associated with a low recurrence rate. The method has not been very popular but is attractive because it is based upon the exclusive use of the patient's tissues and

no prosthetic material is required for the reinforcement of the abdominal wall. The main drawback of the method is that the technique can be used only in subumbilical incisional hernias because only the lower half of the rectus muscle can be safely detached and transposed to the opposite side without interference to blood and nerve supply [13].

The majority of hernia repairs (75%) develop recurrence within the first 2–3 years after surgery [9, 10]. The long-term follow-up demonstrated that only one patient (4.8%) developed recurrence in the midline. The transposed abdominal muscles (Figs. 2 and 3) leave exteriorly two uncovered triangles with peritoneal bulging. Theoretically, the triangles are unprotected and are expected to be the source of recurrence. Inexplicably, the triangles are not of lower resistance, and no recurrence has been developed. Although no selection criteria were used, the patients of the present study were classified as ASA I–II without serious comorbidity. The extensive exposure of the rectus muscles is responsible for seromas, usually complicating surgery. The recorded morbidity rate in this study was 23.8%.

It is obvious that the number of patients is small, and reliable conclusions cannot be definitely conducted.

Conclusions

Nuttall repair seems to carry low risk of severe postoperative complication rate and an acceptable recurrence rate. Although the number of patients that underwent repair of subumbilical incisional hernia is small, the results of the method seem to be encouraging.

References

1. Millikan KW (2003) Incisional hernia repair. *Surg Clin N Am* 83:1223–1234
2. Sauerland S, Schmedt CG, Lein S, Leibl BJ, Bittner R (2005) Primary incisional hernia repair with or without polypropylene mesh: a report on 384 patients with 5-year follow-up. *Langenbecks Arch Surg* 390:408–412
3. Perrone JM, Soper NJ, Eagon JC et al (2005) Perioperative outcomes and complications of laparoscopic ventral hernia repair. *Surg* 138:708–715
4. Mc Greevy JM, Goodney PP, Birkmeyer CM et al (2003) A prospective study comparing the complication rates between laparoscopic and open ventral hernia repairs. *Surg Endosc* 17:1778–1780
5. Goodney PP, Birkmeyer CM, Birkmeyer JD (2002) Short-term outcomes of laparoscopic and open ventral hernia repair: a meta-analysis. *Arch Surg* 137:1161–1165
6. Chrysos E, Athanasakis E, Saridaki Z et al (2000) Surgical repair of incisional ventral hernias: tension-free technique using prosthetic materials (expanded polytetrafluoroethylene Gore-Tex Dual Mesh). *Am Surg* 66:679–682
7. Le H, Bender JS (2005) Retrofascial mesh repair of ventral incisional hernias. *Am J Surg* 189:373–375

8. Nuttall H (1937) Rectus transplantation for midline incisional herniae. *Br J Surg* 25:344–350
9. Anthony T, Bergen PC, Kim LT et al (2000) Factors affecting recurrence following incisional herniorrhaphy. *World J Surg* 24:95–101
10. Luijendijk R, Lemmen M, Hop W, Wereldsma J (1997) Incisional hernia recurrence following “vest-over-pants” or vertical Mayo repair of primary hernias of the midline. *World J Surg* 21:62–66
11. Luijendijk R, Hop W, van den Tol MP et al (2000) A comparison of suture repair with mesh repair for incisional hernia. *N Engl J Med* 343:392–398
12. Hesselink VJ, Luijendijk RW, de Wilt JH, Neide R, Jeckel J (1993) An evaluation of risk factors in incisional hernia recurrence. *Surg Gynecol Obstet* 176:228–234
13. Buker R (1989) Incisional hernia. In: Nyhus LM, Condon RE (eds) *Hernia*, 3rd edn. Philadelphia, Lippincott, pp 321–329