Hernia (1999) 3: 141-147

Hernia

Treatment of incisional hernias by placement of an intraperitoneal prosthesis: a series of 128 patients

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Summary: This is a retrospective study on 128 patients who underwent surgery between 1986 and 1996 for incisional hernia repair with placement of an intraperitoneal prosthesis. A polyester mesh (Mersilene®) was used in 95 cases (74.2%) and one of PTFE in 33 cases (25.8%). Mortality was 2.34% (3 patients) ; 32 patients (25.6%) developed an early postsurgical complication. Overall morbidity was 3.9% (3 cases of postoperative pneumonopathy, one case of decompensated asthma, and one of sural vein phlebitis). Three (2.34%) early intra-abdominal complications occurred, manifest as an intestinal obstruction or postsurgical ileus. Seven patients (5.6%) developed a non-infectious abdominal wall complication, and 17 (13.6%) experienced an infectious abdominal wall complication which in 5 cases (29.4%) required surgery with removal of the prosthesis in 3 cases (60%). One patient (0.78%) developed a late small intestine obstruction, 18 months after the incisional hernia repair. Twenty patients (16%) had a recurrence and 22 (17.6%) complained of abdominal wall pain at an interval after the operation. The investigators concluded that placement of an intraperitoneal prosthesis should be reserved only for those cases in whom placement of an extraperitoneal prosthesis cannot be performed.

Key words: Incisional hernia — Intraperitoneal prosthesis — Postoperative complications — Recurrence

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Received December 16, 1998
Accepted in final form May 7, 1999

Incisional hernia is a complication of laparotomy in 5 to 11% of cases [Louis 1985, MacLanahan 1997]. Its natural history involves progressive worsening with development of respiratory and skin disorders [MacLanahan 1997]. Incisional hernia carries the risk of strangulation. For this reason, surgery is almost always indicated. The recurrence rate after simple suture, ranging from 31 to 50% [Hesselink 1993, Louis 1985], has led to the use of synthetic materials for surgical repair of the abdominal wall since the 1960s. Such prosthetic materials maintain and facilitate the reinsertion of the large abdominal muscles at the midline. A polyester mesh prosthesis (Dacron, Mersi-

lene®) most often is used because of its good tolerance together with its physicochemical properties and texture [Pans 1992]. Its placement, most commonly in extra-peritoneal position (premuscular, retromuscular prefascial, pre-peritoneal position) [Chevrel 1986, 1990, Stoppa 1987], has reduced the recurrence of incisional hernia by 3.5 to 18.5% [MacLanahan 1997, Stoppa 1987]. Extraperitoneal placement of a polyester prosthesis requires wide muscle dissection thus creating local conditions favorable for development of infection [Burgard 1994], responsible for about half of all recurrences [Pans 1992]. Installing the prosthesis in intraperitoneal position avoids the need for such dissection, shortens the duration of surgery and implants the prosthesis deep within highly vascularized tissue. However, intraperitoneal positioning exposes the patient to the risk of bowel obstruction from surgical adhesions and also to gastrointestinal fistula [Chevrel 1986, Pans 1992]. The objectives of this study were to evaluate the rate of abdominal wall complications (infectious or non-infectious), intraperitoneal complications (obstruction or fistula) and the recurrence rate associated with intraperitoneal implantation of a non-absorbable prosthesis.

Material and methods

One hundred and twenty-eight patients underwent surgery between April 1986 and April 1996 for incisional hernia repair with placement of a non-absorbable mesh in an intraperitoneal position at the Department of Surgery of the University Hospital Center CHU-Nancy, France. There were 57 men (44.5%) and 71 women (55.5%). Mean age was 59 years (range: 23-91 years). 66.4% had one or more concomitant disorders (diabetes, respiratory insufficiency, peripheral arterial disease, cardiovascular disease, or were receiving immuno-suppressant therapy). Patients were considered as obese if their actual weight exceeded their theoretical weight by more than 20% according to Lorentz' formula: T - 100 - (T-150) / 2 for women and T - 100 - (T-150)/ 4 for men. 72% of patients were obese (86% of women, 57% of men).

The anatomical location of the incisional hernia was as follows:

- supraumbilical in 54 cases (42.2%);
- infraumbilical in 19 cases (14.8%);
- supra- and infraumbilical in 49 cases (38.3%);
- lateral in 6 cases (4.7%).

Seventy-seven patients (60.2%) had previously undergone surgery for incisional hernia at least once with herniorrhaphy or placement of an intraperitoneal prosthesis (45 once, 24 twice, 5 three times, and 3 more than 3 times).

Patients underwent surgery under general anesthesia. After excision of the scar, the herniated sac and its neck were dissected. The sac then was opened, and any adhesions to the musculoaponeurotic layer were divided. The greater omentum was draped anteriorly over the internal abdominal organs and sutured to the parietal peritoneum with absorbable interrupted sutures. The polyester mesh (Mersilene®) was then attached to the parietal peritoneum with surgical staples, about 8 to 10 cm from the edges of the incisional hernia. If the greater omentum was missing, a PTFE graft (polytetrafluorethylene) was used. The PTFE graft was sutured to the parietal peritoneum with double 0 PTFE over-and -over sutures. After dissection, the edges of the hernia were closed by simple sutures in front of the mesh. In case of tissue loss not allowing such suturing, the hernia sac was sutured overwards in front of the mesh. The subcutaneous tissue and skin then were closed. A drain was not routinely inserted (19 patients with no drain, i.e. 14.84%) although in the majority of cases this was done with one or more suction drains placed in contact with the prosthesis.

The size of the mesh used was 15x30 cm in 55 cases (43%), 30x30 cm in 54 cases (42.2%) and 50x30 in 19 cases (14.8%). Mersilene® was used in 95 cases (74.2%) and PTFE in 33 cases (25.8%). No antibiotic prophylaxis was administered. Mean operation time was 74 minutes (range: 25 - 180 min.). Mean hospital stay was 11.5 days (range: 6 - 60).

A retrospective analysis was performed based on patients' records and the consultation routinely conducted at postoperative week 6. All patients were interviewed by phone or were reexamined at the time of the study. All symptoms suggesting a late intraperitoneal complication, residual abdominal wall suppuration, recurrence of incisional hernia requiring repeat surgery or not, and long-term chronic abdominal wall pain were sought. Mean follow-up was 48 months after surgery (range: 12 - 96 months). Eleven patients died during the study. Follow-up of these patients was obtained either through the patient's family physician, or his/her family.

Results

Immediate postoperative period

Three patients died during the immediate postoperative period (2.34% mortality). One 62-year old female patient developed respiratory distress probably as a result of a Mendelson syndrome on day 3. One 76-year old female patient died from a myocardial infarction (MI) on day 2. The third patient, a 46-year old man, developed a massive pulmonary embolism on day 4, which was fatal, despite emergency embolectomy.

Thirty-two patients out of 125 experienced postoperative complications (25.6%): three developed postoperative pneumonopathy, one developed decompensated asthma, and one female patient sural vein phlebitis. Three early intraperitoneal complications were observed (2.4%). One 58-year old male patient developed small intestinal obstruction on postoperative day 15. Surgery performed revealed a small intestinal adhesion to the prosthesis, which was not entirely separated from the greater omentum. Adhesiotomy required partial excision of the prosthesis without further recurrence. The second patient, a 48-year old male with

cirrhosis, developed a subacute obstruction associated with decompensated cirrhosis with ascites. Medical therapy (GI suction, needle puncture of the ascites) resolved the obstruction. Two months later, the prosthesis was removed because of infection in contact with it. The third patient, a 53-year old male developed post-operative ileus after initial resumption of GI motility. This complication was treated by having the patient abstain from solid food for a time and GI motility resumed 4 days later.

Seven non-infectious abdominal wall complications occurred (5.6%): intrabdominal hematoma in one case surgically removed a month after placement of the prosthesis with uncomplicated follow up and with no recurrence after 3 years. The second case involved a seroma that formed in front of the prosthesis and which was drained percutaneously under CT-scan control with uncomplicated follow-up (no infection of the prosthesis, no recurrence of seroma or of the incisional hernia). One female patient who underwent repair of incisional hernia together with dermolipectomy developed subcutaneous necrosis, which required multiple debridements in the operating room. Healing was achieved with no complications for the prosthesis and without recurrence of incisional hernia. The four other cases of aseptic abdominal wall complication were cutaneous desunion with serous discharge, which subsequently dried up and healed following local wound care.

There were 17 (13.6%) septic abdominal wall complications. All of them, except one, were observed during the first 30 postoperative days. Twelve cases involved skin inflammation, infected serous discharge and subcutaneous abscess. Treatment did not require surgery and consisted of debridement of the cutaneous scar followed by local care, together with lavage of the surgical wound in two cases. In five cases (4%) the depth or extent of infection required repeat debridement. In two instances, the prosthesis was not involved. In three cases (2.4%) the prosthesis was infected and had to be removed (partial removal in one case, and total in two cases), leading to recurrence of incisional hernia.

Late sequelae

A small intestinal obstruction occurred 18 months after surgery, which resolved after four days of medical therapy.

Twenty patients (16%) developed a recurrence. Seven cases of recurrence, i.e. 35%, occurred following postoperative abdominal wall infection ($p < 0.007$; chi2 test). Fourteen patients did not undergo surgery, either because of a contraindication to anesthesia, or a refusal by the patient, or because the incisional hernia was well-tolerated by the patient wearing a truss.

Six patients were reoperated for recurrence: in two cases, the new prosthesis was placed in retromuscular prefascial position with a good result. In three cases, the prosthesis was again placed in intraperitoneal position with two good results and one postoperative abscess requiring mesh removal and subsequent placement of another mesh in intraperitoneal position. The last patient, a woman, underwent emergency surgery for strangulated incisional hernia and the abdominal wall was simply resutured. These repeat procedures revealed disinsertion of the PTFE patch in 2 cases, and rupture of the Mersilene® prosthesis in one case.

Twenty-two patients (17.6%) complained of abdominal wall pain at the site of prosthetic implantation more than 6 months after surgery. In 21 cases, the prosthesis used was a polyester mesh fixed by surgical staples and one case involved a PTFE prosthesis fixed with PTFE double 0 over-and-over sutures. In one case, the pain was disabling (polyester mesh).

In summary, 9 complications occurred in the group treated with PTFE prosthesis, (33 patients, i.e. 27.3%) vs 61 in the group treated with polyester (95 patients, i.e. 64.2%). Overall mortality and morbidity were not taken into account, since these two variables were not affected by the type of prosthesis but by the surgical procedure itself.

Discussion

Since 1977, some investigators [Adloff 1987, Arnaud 1997, Becouarn 1996, Louis 1985] have inserted prosthesis in an intraperitoneal position, a simpler procedure not requiring wide dissection. Since such dissection is not necessary, intraperitoneal placement of the prosthesis can decrease morbidity from infection [Adloff 1987, Becouarn 1996].

Mortality in our series was 2.3%, comparable to that of series reported in the literature (0% to 3.5%), regardless of prosthesis location [Becouarn 1996, Burgard 1994, Louis 1985]. Such mortality was related to individual context and decreased over time (from 5 to 9% in 1977 to less than 3% and even 0% in the 1990s [Arnaud 1997, MacLanahan 1997, Validire 1986].

Early morbidity (general complications, obtruction, non-infectious and infectious abdominal wall involvement) in our series was 26.5%, a level comparable to that of other series of intra-abdominal prostheses: from 5 [Arnaud 1997] to 45% [Baulieux 1988] and similar to series of extraperitoneal prostheses: from 7.8 [Costalat 1991] to 46% [White 1998].

General complications in our series was 4%, consisting mainly of respiratory infections. MacLanahan [1997] reported an 18% rate of general complications in 104 patients operated on, (39% pulmonary complications and 22% cardiac complications). Other series in the literature have reported rates ranging from 0 [Druart 1988, Validire 1986] to 18% [Horhant 1996, Samamma 1997].

Three patients in our series (2.4%) developed postoperative small bowel obstruction requiring surgery in one case; obstruction was due to a small intestinal adhesion on a portion of the prosthesis not protected by the greater omentum. These early postoperative obstructions occur whether the prosthesis is in intraperitoneal or preperitoneal position, but were reported more often with intraperitoneal prosthesis: MacLanahan [1997] reported 6 cases of postoperative obstruction (5.76%) in his series of patients in

whom incisional hernia was treated with preperitoneal prosthesis, and all of these obstructions resolved with medical therapy. Horhant [1996] reported a case of postoperative obstruction requiring adhesiotomy on postoperative day 13. In Mathonnet's study [1998] which compared intra and extra-peritoneal prostheses, the only obstruction reported occurred in the intraperitoneal mesh group and required reoperation on day 8. Samama [1997] reported 3 cases of obstruction in contact with the mesh. Leber [1998] in his study on the type of prosthesis and site of implantation reported an 8% rate of postoperative ileus, without specifying the site of implantation. It seems, therefore, that the early post-operative obstruction is commoner in cases of intraperitoneal placement of the prosthesis, the small bowel being able to adhere to the prosthesis when this is exposed, usually necessitating reoperation [Louis 1985].

Local morbidity includes superficial or deep abdominal wall complications, aseptic (hematoma, seroma) or septic. In our series, non-infectious complications affected 7 cases (5.6%) requiring percutaneous drainage of a seroma in one case and surgical removal of an intra-abdominal hematoma in another. In the literature, the complication rate ranges from 2.27 [Arnaud 1997] to 16-22% [Ambrosiani 1994, Burgard 1994, Gillion 1997] and outcome most often was favorable with local care. Only intra-abdominal hematomas have required surgery (one case for Burgard 1994 and one case for Ambrosiani 1994). The complication rate was slightly higher, i.e. from 3.2 [Chevrel 1990, Costalat 1991, Louis 1985] to 27% [Cubertafond 1989], with an extraperitoneal prosthesis. To achieve wound healing, these required more repeat procedures often with excision of part of the prosthesis, since the prosthesis is closer to the skin and thus more prone to exposure.

The rate of infectious complications in our series was 13.6% (17 patients), a higher figure than those reported in the literature, ranging from 2 [Mathonnet 1998] to 5% [Becouarn 1996, Samama 1997]. Superficial infections not involving the prosthesis were treated with local wound care, with no sequelae. Such superficial infections were the most common septic complications in series of incisional hernias treated with placement of an intraperitoneal prosthesis [Baulieux 1988, Burgard 1994, Mathonnet 1998] as seen in 12 out of 17 cases of sepsis in our series. They had no adverse impact on the patient, since the prosthesis was deeply implanted. On the contrary, when infection was in contact with the prosthesis, reoperation was necessary to cleanse and drain the affected area and often the prosthesis had to be removed [Becouarn 1996]. Among the five cases in our series which required reoperation, 3 prostheses (2.4%) had to be removed to achieve recovery from sepsis, the same figure reported by Arnaud (3 instances of prosthesis removal out of 5 cases of deep sepsis) [Arnaud 1997]. These cases of deep-seated sepsis were serious adverse events for the patient because the prosthesis was implanted intraperitoneally, with a consequent risk of life-threatening peritonitis. Mathonnet [1998], reported one case of an infected prosthesis due to an infected dermatosis which resulted in death of this female patient from peritonitis on postoperative day 12. Louis [1985] reported one death from peritonitis with small intestinal perforation in the only incisional hernia in his series (247 patients) treated with an intraperitoneal prosthesis. The rate of sepsis in our series perhaps can be accounted for partly by the absence of antibiotic prophylaxis. Since then, this approach has been modified: antibiotic prophylaxis is now routinely administered during induction of anesthesia.

This rate of 13.6% was closer to the rate of infectious complications in cases of extraperitoneal prosthesis placement. This rate ranges from 4 to 18% [MacLanahan 1997, Validire 1986, White 1998]. Even when the prosthesis is directly involved, such infections can be treated by local wound care, which can be long [Cubertafond 1989]. In cases in which such treatment fails, recovery from chronic suppuration may require removal of the prosthesis (2% in Louis' series) [Louis 1985]. Infectious complications can occur up to several years after a surgical procedure [Louis 1985]. Several factors can promote the occurrence of septic complications: the combination of a septic procedure, a previous history of abdominal wall infection or incisional hernia repair performed too early after a septic operation, the use of transfixating sutures on the abdominal wall knotted on bolsters to attach the prosthesis, the number of suction drains inserted [Louis 1985], the duration of surgery, or an improperly installed prosthesis with wrinkles [Costalat 1991]. Only Leber [1998] has reported a higher rate of infectious complications depending on type of prosthesis used, regardless of location, and unfavorable to the use of Mersilene® (vs Marlex®, PTFE, or Prolene®): 16 vs 0-6%. After intraperitoneal placement of the prosthesis, most investigators [Ambosiani 1994, Baulieux 1988, Druart 1988, Gillion 1997] bring the musculoaponeurotic edges close together in the midline to isolate the prosthesis as far as possible from the surgical skin wound and thus decrease the risk of infection of the prosthesis in the event of superficial suppuration. Drawing the two opposite edges of the wound together must be performed without exerting undue tension (risk of respiratory decompensation in patients with respiratory insufficiency), and is rarely possible in cases of major incisional hernia [Baulieux 1988]. If the edges of the musculoaponeurotic layers cannot be brought close together, either fibrous tissue from the incisional hernia sac can be placed between the prosthesis and the subcutaneous tissue [Baulieux 1988] or the prosthesis can be covered by a musculoaponeurotic abdominoplasty, using Welti and Eudel's technique [Adloff 1987, Arnaud 1997, Becouarn 1996]. The latter enables reinforcement of the abdominal wall repair while isolating the prosthesis from the surgical wound [Arnaud 1997].

The disadvantage of a musculoaponeurotic abdominoplasty, using Welti and Eudel's method, is the need for a wide dissection of the sub-cutaneous

layer with the risk of hematoma and/or subcutaneous suppuration. However, Arnaud [1997], who routinely used this technique to cover the prosthesis in his series of 220 patients, reported a rate of deep infection in contact with the prosthesis nearly half that observed in our series: 5 cases out of 218 patients operated (2.29%) vs 5 out of 125 patients operated (4%) in our series.

Long-term intra-abdominal complications reported in the literature are associated with intraperitoneal prostheses [Horhant 1996, Mathonnet 1998, White 1998]. In our series, one of our patients developed an intestinal obstruction at an interval after surgery, successfully managed with medical therapy, and no cases of enteric fistula. Leber [1998] reported a 27% rate of late-onset complications, up to 3.3 years after surgery. Of these, 5.4% were small bowel obstructions and 3.5% enterocutaneous fistulas. According to this investigator, these complications were related to the prosthesis, which was in direct contact with the small bowel. White [1998] also reported an 11% rate of enterocutaneous fistula in cases of intraperitoneal placement of the prosthesis vs 0% with preperitoneal prosthesis. Two other investigators have reported enterocutaneous fistula with intraperitoneal prostheses [Karakousis 1995, Kaufman 1981]. While enterocutaneous fistulas are infrequent, migration of intraperitoneal prostheses into the digestive tract is rare. The report by the French Association of Surgery published at the 92nd French Congress of Surgery [Chevrel 1990] described two cases. One case involved migration into the gastric lumen, and the other migration into the small intestine. Two other cases of colonic-cutaneous fistula secondary to prosthetic migration have been described in the literature [DeGuzman 1995, Kaufman 1981]. It is clear that all cases of enterocutaneous fistula are not reported in the literature [Chevrel 1990].

The recurrence rate in our series was 20%, while figures reported in the literature are often between 0 [Baulieux 1988] and 5% [Arnaud 1997, Burgard 1994, Mathonnet 1998] and between 14% [Samama 1997] and 42.1% [Ambrosiani 1994]. The recurrence rate with extraperitoneal prosthesis ranges from 0.97 to 18.5% [Chevrel 1997, Costalat 1991, Cubertafond 1989, Louis 1985, Mathonnet 1998, Stoppa 1987]. Whatever the surgical technique used, the majority of recurrences occur during the first two years after incisional hernia repair [Champetier 1990]. Two causes of recurrence can be differentiated, septic or mechanical. Cases of prosthetic-related infection require removal of all or part of the prosthesis, especially if it is in intraperitoneal position [Arnaud 1997]. The effect of removal of an infected prosthesis is recurrence, as occurred in 3 patients in our series. Even though removal of the prosthesis due to infection in patients treated with an extraperitoneal prosthesis is less common, the recurrence rate is just as high after prosthesis removal [Champetier 1990, Stoppa 1987]. The rate of infection-related recurrence in our series was 5.6%, a figure comparable to series in which extraperitoneal placement was used (2 to 9.6%) [Cubertafond 1989, Louis 1985].

Mechanical-related cases of recurrence are more common in cases of intraperitoneal prosthesis placement. This accounted for 65% of recurrences in our series, i.e. 10.4% of patients and 75% of recurrences in Arnaud's series [1997], or 2.72% of his patients. In cases of extraperitoneal placement, the rate was much lower, 3.2 to 4.5% [Champetier 1990] and was rarely due to rupture of the prosthesis but rather to inadequate size of the prosthesis [Cubertafond 1989, Mathonnet 1998]. In cases requiring reoperation with placement of an intraperitoneal prosthesis, it was observed that either the recurrence occurred at the lower or upper part of the prosthesis (prosthesis not sufficiently covering the defect in the abdominal wall, especially in the infraumbilical area, with the bladder limiting fixation of the prosthesis inferiorly) or the prosthesis was disinserted laterally [Arnaud 1997, Champetier 1990]. PTFE prostheses placed intraperitoneal may be subject to disinsertion more frequently (2 cases in our series) because the weak inflammatory reaction between the prosthesis and the peritoneal layer may promote the occurrence of a break in the abdominal wall, causing the recurrence [Ambrosiani 1994]. Since our study did not aim to compare the Mersilene® prosthesis with that of PTFE, we cannot make any conclusion on the choice of material to be used. Contradictory results have been reported for PTFE in the literature [Gillion 1997, Leber 1998], which was unfavorable for Mersilene® (34% recurrence rate vs 10-14% with other types of prostheses) [Leber 1998].

Twenty-two patients (17.6%) in our series complained of chronic pain at an interval after surgery (more than 6 months later) at the site of prosthesis implantation. Such cases of abdominal wall pain are little reported in the literature, both with intra- as well as extraperitoneal prostheses: 9.1% [Mathonnet 1998] to 25% [Costalat 1991], or even 45% [MacLanahan 1997] for pre-peritoneal prostheses and 11% [Burgard 1994] to 16.9% [Mathonnet 1998] for intraperitoneal prostheses. According to Baulieux [1988], such abdominal wall pain can be explained by the site of stapling and thus it is sufficient to remove the staple causing the problem by making a short skin incision under fluoroscopic control to eliminate such pain. Costalat [1991] recommends that, when inserting staples in the muscle layer, the surgeon should avoid exerting undue external counter-pressure to avoid catching the skin layer with the staples. For MacLanahan [1997], such residual pain is related to the very structure of the material used to construct the prosthesis (a more rigid Marlex prosthesis). In his series 7% of patients had limited activity because of discomfort they experienced (vs one case in our series).

Choice of the prosthesis material has been investigated in many studies, both experimental studies and clinical trials. They have concluded that the best prosthetic material tolerated by the body is the one, which develops the highest fibroblast activity with the least inflammatory reaction [Adloff

1987, Pans 1992], implying firmer installation in the abdominal wall. The mesh size of the prosthesis must be large enough to allow rapid healing with formation of granulation tissue [Becouarn 1996]. The Dacron saturated polyester knitted mesh prosthesis (Mersilene®) has been widely used in France with preperitoneal placement since studies by Stoppa [1987] and intraperitoneal placement following Adloff's work [1987], and Arnaud's studies [1997]. In the US, extruded polypropylene mesh (Marlex), a material which is less supple and less extensible than Mersilene®, is used the most. The behavior of these non-absorbable mesh materials placed against the peritoneal aspect of the abdominal wall is approximately the same for both. The omentum or the small intestine adheres to the prosthesis starting on postoperative day 3 [Champetier 1990]. Gradually, the deeper aspect of the mesh is covered by a pseudo-serosa, producing loose adhesions to the small bowel. According to US investigators who have compared different types of prostheses both in intra- as well as extraperitoneal position, the majority of infectious and occlusive complications, and enterocutaneous fistulas were linked to use of Mersilene® prostheses, regardless of its position, and these investigators have even recommended that this material be abandoned [Leber 1998].

Among non-absorbable materials, expanded polytetrafluoroethylene (ePTFE) appears to be the material which produces the fewest adhesion to the small bowel when placed directly in contact with the latter, in cases where the greater omentum is missing [Ambrosiani 1994, Gillion 1997]. This is the reason why PTFE material was chosen in our series when a non-absorbable material was used (33 times i.e. 25.8%) The complication rate in our series excluding mortality and overall morbidity, was 64.2% for incisional hernia treated with placement of a Mersilene® lamina against 27.3% for incisional hernia treated with placement of PTFE lamina. However, these two groups of patients treated with two different materials were not comparable and the aim of this study was not to compare these two types of prosthesis. The few results reported in the literature on use of PTFE are contradictory [Ambrosiani 1994, Gillion 1997]. The rate of localized infection ranges from 3.5 to 17.2% and the recurrence rate from 2 to 42.1%!

Conclusion

The results of this series are no better than those in which extraperitoneal prostheses were used, reported in the literature. The high rate of infectious complications perhaps can be accounted for by the lack of antibiotic prophylaxis. Even though serious intraperitoneal complications related to the surgical technique did not occur in this series of patients, the recurrence rate, which probably was underestimated, was high (16%). Such recurrences are probably due to positioning of the prosthesis and the fact that in some cases it was impossible to completely cover the defects in the abdominal wall. Although initially we were interested by the ease and rapidity with which this technique is used, our current approach has been to return to using prosthesis placed in extraperitoneal position. Indications for intraperitoneal prostheses are reserved solely for cases where it is not feasible to install a prosthesis in extraperitoneal position. If the greater omentum exists, we use a Mersilene® prosthesis. The PTFE prosthesis continues to be indicated in cases where the prosthesis is in direct contact with the small bowel.

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