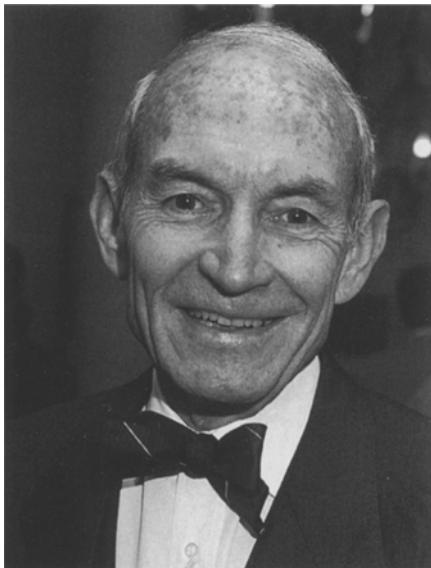


*Editorial***Evolution of large ventral incisional hernia repair.
The French contribution to a difficult problem**R. Stoppa¹, F. Ralaimiaramanana², X. Henry³ and P. Verhaeghe⁴*Correspondence to: R Stoppa, University
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Not surprisingly, since the rise of abdominal surgery, the weak abdomen of the human biped, already naturally subject to hernias, has been provided by laparotomy with regrettable iatrogenic opportunities for herniation of a complex kind. This paper briefly traces the original contributions of French surgeons still currently applied in ventral incisional hernia repair. It also reports the beneficial results of the resulting tactics through the experiences of ourselves and others in this difficult field of surgery.

There has been a long tradition for French surgeons in the field of large incisional hernia (LIH) repair. Cruveilhier and "Traumatic hernias" [1849], and Lucas-Championnière and the understanding of abdominal muscle pathophysiology [1895], can be cited at the times when, respectively, anesthesia and the antiseptic/aseptic method first appeared. The most recent assessment of our knowledge in this particular field have been made in comprehensive syntheses by Rives et al [1973-1985], Chevrel [1985-1990], and some other GREPA members. These studies have provided a better understanding of the complex pathologic and physiopathologic aspects of LIH and of the necessity for careful preoperative management of the patients, stressing major trends widely accepted in France in this complex field.

Rives, Flament [1977] and Palot [1996] have clearly presented the pathophysiologic aspects of L.I.H. Briefly, it is composed of: (1) a prerequisite background of systemic disorders; (2) damage to all regional parietal layers, mostly in hernias whose defect diameter exceeds 10 cm; (3) disturbance of ventilatory function, through impairment of the synergy between the abdominal wall and the diaphragm; (4) several other visceral, vascular and statodynamic disorders. These complex situations have been

given the name of "eventration disease" by Rives [1973].

Owing to the impairments cited above, careful preoperative management of the patient is mandatory, and this too has been carefully discussed by Rives et al [1973, 1977]: all systemic risks must be evaluated and corrected before surgery; this may result in either patient selection or exclusion. Dermatologic care and respiratory physiotherapy must be carefully applied. The preoperative progressive pneumoperitoneum, proposed by Goni-Moreno (a francophone Argentine surgeon) [1947] is widely accepted in France, despite its relative constraints, and is mostly indicated in LIHs with irreducible contents (15% in our practice). Rives et al [1977, 1996] insist that the surgeon is not solely in charge during preparation of the patient but should cooperate with the internist, physiotherapist and anesthesiologist. Patient preparation for surgery is as important as the operation itself in obtaining satisfactory results.

The main objectives of surgery, as assessed by Chevrel and Flament [1995] and J.P. Palot [1996] are the following: (1) closure of the parietal defect without excessive tension; (2) anatomic reattachment of the muscles through the tendon-like action of a mesh prosthesis; (3) normalization of the intraabdominal pressure at the time of closure of the

Table 1. Our technical choice in 3 personal series (%)

Year of serie reports	1981	1985	1987
Raphies	22	8.4	7.3
Large prostheses	70	69.4	61.5
Shoe-lace procedure	-	5.4	15.8
Aponeuroplasties	3	3.2	3.5
Auxiliary prostheses	-	9.1	8.1
Other techniques	5	4.5	3.8

Table 2. Long term (1-12 years) results (N = 551)

	NPR	PR
Satisfactory	56%	86%
Septic recurrences	6%	4%
Aseptic recurrences	34%	3%
Bulging	4%	5.5%
Reoperation on above mentioned recurrences	38%	7%

NPR, nonprosthetic repair ; PR, prosthetic repair

Table 3. Recurrence rates in recently published French series (after 3-10 years follow-up)

	Patients	NPR	PR
CFC (1990)	1033	24%	8.6%
Flament (1990)	388	24%	2.6%
Flament, Palot (1995)	258	14%	6.2%
Chevrel (1997)	389	18.3%	5.5%

CFC, Congrès Français de Chirurgie

parietal defect. Thus the technical principles to be respected in LIH surgery are the following: (1) simple closure of the defect is not effective when the aperture exceeds 5 cm in diameter, mostly at the midline; (2) routine use of very large nonabsorbable mesh prostheses in aseptic cases, preferably made of macroporous materiel. In this context Acquaviva [1948] and Bourgeon [1955] have pioneered the use of nylon mesh; Rives introduced the dacron mesh into France [1965] and many French surgeons currently use this material; some experimental French researches on prosthetic fabrics can be cited: Stoppa and Petit [1973], Arnaud and Adloff [1976], Stoppa and Soler [1993], Chevrel and Rath [1996]; (3) the mesh should not be fixed to the damaged edges of the wall, but used as either wide overlapping underlays by retromuscular interposition [Rives, 1973], or preperitoneal

wrapping of the visceral sac [Stoppa, 1973], or large premuscular overlays [Chevrel, 1979]; (4) the intraperitoneal placement of nonabsorbable mesh is strongly contraindicated as potentially responsible for occlusion or/and intraluminal migration.

In practice, three methods of surgical cure of LIH are currently used in France: (1) the large retromuscular prefascial prosthesis [Rives et al, 1973]: after careful preparation of the patient, a wide dacron mesh prosthesis is positioned behind the rectus mm. and in front of their posterior sheath; peripheral fixation of the mesh is done throughout the two lineae albae; elective indications are median umbilical and supraumbilical hernias (2) the large preperitoneal & retrofascial prosthesis [Stoppa, 1973]: same careful preparation of the patient; a wide dacron mesh prosthesis is placed in a preperitoneal position, behind the endoabdominal fascia (as in GPRVS for inguinal hernia repair); peripheral fixation of the mesh is done throughout the wall; a dermolipectomy is added when necessary; elective indications are median subumbilical, and all lateral hernias (3) the large premuscular prosthesis [Chevrel, 1979] consists of an overlapping aponeuroplasty of the anterior rectus sheath, followed by a large mesh apposed anteriorly to the muscles; mesh fixation is made with peripheral sutures and fibrin glue spray; elective indications are median hernias.

Some French auxiliary procedures are currently used, such as anterior rectus sheath aponeuroplasties, following Quénu [1896] or Welter-Eudel [1941]: apart from being used separately in the repair of small hernias, they may be used in association with a mesh in LIH treatment. As regards relaxing incisions in the anterior rectus sheath, we prefer Clotteau-Prémont's quincunxial incisions [1979] to the ones of Gibson [1920] or Ponka (the latter cause too much damage the wall). Gosset [1936] has pioneered in the "shoe-lace" technique, using an autogenous skin ribbon ; this is useful for solving the problem of reapproaching the distal edges of a wide subumbilical gap.

Lastly, let us mention two procedures of exceptional use: (1) The in situ buried cutaneous flap [Stoppa, 1961] is simple to perform, not very strong but better than nothing in poor-risk patients: a cutaneous flap of the same shape and size as the parietal defect is circumscribed and left adherent to the sac, then sutured to the edges of the defect without opening the peritoneum and finally buried under the suture of the subcutaneous layers and skin (2) The use of a deep absorbable mesh combined with a more superficial nonabsorbable one when, exceptionally, it is impossible otherwise to close the peritoneum [Champault, 1988].

Of course, all the problems of this complex surgery have not been solved but the results reported over the last 25 years show two types of progress: (1) the global success rate has dramatically increased, and (2) very difficult cases of LIH until recently regarded as unsuitable for surgery can now be surgically cured. As an illustration of this we briefly report our experiences and cite those of others. During the period 1971-1987, 616 incisional hernias (IH) were operated. Mean ages were 56.5 years for women and 51.5 for men, range from 21 to 91 years. The sex ratio M/F was 33.8/66.2. Anatomic aspects of the series are the following: a predominant incidence of median IH (82.2%); 2/3 IH were difficult to repair: average-sized defect of 5 - 10 cm 33.8%, large defect of > 10 cm 21.5%, multiple defects 11.2%, recurrent IH 18%. Clinical features: some IHs needed emergency surgery (irreducible, strangulated, sacular peritonitis); many needed careful preparation (sepsis, obesity, respiratory insufficiency, cirrhosis). Table 1 shows the evolution of our technical choice in 3 sub groups (1981, 1985, 1987): the number of herniorrhaphies has decreased, large prostheses have been widely used, the number of "shoe-lace" procedures has been gradually increasing.

Simple postoperative course rates were similar for nonprosthetic (NPR: 82%) and prosthetic repairs (PR: 87%). There was a higher mortality in the

NPR group (2.1%) compared to the PR group (0.9%), but emergency cases are included in the former group. The complication rate was 18% in the NPR group and 13% in the PR group; thus the latter are not more severe operations than the former in well-prepared patients. Approximately 90% of our patients have been followed up for 1 to 12 years: 211 NPR and 340 PR. Table 2 shows the better long-term results for PR than NPR. Similarly, long-term final healing rates (after reoperation when necessary) were 68% for NPR and 92.5% for PR. Lastly, Table 3 reports the

recurrence rates in some recent French series, showing agreement with our favorable results using PR in LIH.

French studies have provided a better understanding of LIH, appropriate preoperative management and selection of patients for surgery, efficient use of very large pieces of macroporous mesh following the above-mentioned types of placement. They have received extensive multicentric agreement and are deserving of the widest acceptance. Nevertheless, LIHs still pose difficult residual problems which need additional research on several aspects, such as:

(1) the prevention of postoperative herniation at the time of primary laparotomy closure (and from this viewpoint, it would be helpful if laparoscopic surgeons avoided some of these complex hernias); (2) the surgical procedures would be simplified by assessment of antiadhesion barriers allowing a simpler intra-abdominal placement of the prosthetic material; (3) fabrics should preferably be both lighter and stronger for more functional fitting. Thus the treatment of LIH still poses an important challenge made to surgeons interested in abdominal wall surgery.

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