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Hernia repair in the Lombardy region in 2000: Preliminary results

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Abstract Hernia repair is the most common surgical procedure in general surgery in Italy and in the Lombardy region. In the last decade, the use of mesh, the concept of a tension-free technique, and the postoperative rate of recurrences after Bassini or Shouldice operations have completely changed the surgical approach to hernia repair. For this reason, we sent a questionnaire to 148 surgical departments in the Lombardy region to investigate about total hernia operations performed in 2000 in Lombardy, the surgical approach, the surgical techniques used, the type of anesthesia and the hospital stay. One hundred five out of 148 surgical departments returned the questionnaire, and we collected information on a total of 16,935 surgical operations for hernia: 16,494 were performed using tension-free techniques. The inguinal anterior approach is the one of choice for primary and recurrent inguinal hernia, whereas the open preperitoneal and laparoscopic approaches are limited to bilateral and recurrent hernias. The majority of cases were treated under locoregional anesthesia and with a hospital stay of two nights.

Keywords Hernia · Surgical repair · Mesh · Hospital stay

Introduction

The basic principles of the tension-free hernioplasty and the introduction of the use of the mesh has dramatically changed the manner in which this common operation is performed. The fact that these procedures are performed without tension has led to assertions that they have significant advantages in terms of postoperative pain, returning to normal activities, and recurrences [1, 2, 3].

For these reasons, in recent years, an evolution occurred from the traditional herniorrhaphies (Bassini and Shouldice operation) toward the prosthetic techniques.

Considering that hernia repair was the most common surgical procedure in Italy in 1999—152,453 operations were performed, as recorded by the Health Ministry, and 20,284 (13.3%) in the Lombardy region—we decided to examine at the beginning of 21st century the state of the art in hernia surgery. For this, we evaluated the surgical approach, the methods of repair, the type of anesthesia, and the hospital stay in the treatment of inguinal and femoral hernias in Lombardy.

Patients and methods

In January 2001, we sent a questionnaire to all 148 surgical departments of university, public, and private hospitals in the Lombardy region. We investigated the total number of primary monolateral, primary bilateral, monolateral and bilateral recurrent groin hernias, primary and recurrent femoral hernias operated on in the year 2000. We also investigated the surgical approach (open inguinal or preperitoneal and laparoscopic), the surgical technique employed, the type of anesthesia (local, locoregional, or general), and the hospital stay (ambulatory surgery, 1-day surgery [only one night in the hospital] and ordinary surgery [two nights in the hospital]) for each group. We also investigated the type of mesh employed and the incidence of postoperative recurrences; in the last case, no evaluation criteria concerning recurrences rate were considered.

Results

One hundred five of 148 surgical departments (71%) returned the questionnaire.

Information on 16,935 surgical operations for hernia repair was recorded in this study.

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We recorded 13,819 operations for *primary monolateral groin hernia*.

Of these, 96.5% were performed using open inguinal access and 3.5% using laparoscopy (Table 1). In 98.6% of cases, the tension-free technique was employed: Trabucco operations in 45% of cases, Lichtenstein in 44.6% and other techniques (Rutkow, Prolene Hernia System, PAD) in 10.4%. Only 1.4% of patients were treated with Bassini or Shouldice operations. Type of anesthesia for each group of patients is listed in Table 1. A total of 1,285 cases of *primary bilateral groin hernia* was recorded, and all cases were treated with mesh (Table 2). Open inguinal approach was employed in 74.7% of cases. Trabucco operation was performed in 49.4%, Lichtenstein in 40.6%, and other techniques in 10% (Rutkow, Prolene Hernia System, PAD). The laparoscopic approach was employed in 17.3% of cases; open preperitoneal approach (Stoppa technique) was employed in 8%. Type of anesthesia is listed in Table 2.

A total of 661 cases of *femoral hernia* was recorded (Table 3). The surgical approach was femoral in 60%, inguinal in 34.3%, and laparoscopic in 5.7% of cases. In 63% of cases, the tension-free technique was employed, using only plug or mesh and plug; in 37% the surgical technique was not specified, but a simple closure of the defect was performed. Type of anesthesia is recorded in Table 3.

A total of 1,170 cases of *recurrent inguinal and femoral hernia* was recorded: 83.5% were inguinal monolateral, 12.5% inguinal bilateral, and 4% femoral (Table 4). The type of primary repair performed was not known in all cases of inguinal or femoral hernia. In all operated cases, the tension-free technique was used. Surgical approach for different groups of recurrent hernia, inguinal, and femoral, are summarized in Table 4; the type of anesthesia for recurrent inguinal hernia and recurrent femoral hernia is listed in Table 5.

Table 1 Primary monolateral inguinal hernia

Surgical access	Surgical technique	<i>n</i>	General anesthesia (%)	Locoregional anesthesia (%)	Local anesthesia (%)
Inguinal access	Tension-free	13,135	21%	46.7%	31.4%
	Suture	197	27.9%	48.5%	23.6%
Laparoscopic access	TAPP	477	98.7%	1.3%	–
	TEP	10			

TAPP = Transabdominal preperitoneal; TEP = Total extraperitoneal

Table 2 Primary bilateral inguinal hernia

Surgical access	Surgical technique	<i>n</i>	General anesthesia (%)	Locoregional anesthesia (%)	Local anesthesia (%)
Inguinal access	Tension-free	960	36.2%	50.1%	13.7%
	Suture	–	–	–	–
Preperitoneal access	Stoppa	103	46%	54%	–
Laparoscopic access	TAPP	212	100%	–	–
	TEP	10			

TAPP = Transabdominal preperitoneal; TEP = Total extraperitoneal

Table 3 Primary femoral hernia

Surgical access (<i>n</i>)	Surgical technique	<i>n</i>	General anesthesia (%)	Locoregional anesthesia (%)	Local anesthesia (%)
Femoral access (396)	Mesh/plug	379	25%	41%	34%
Inguinal access (227)	Suture	244			
Laparoscopic access (38)	TAPP	38	100%	–	–
	TEP	–			

TAPP = Transabdominal preperitoneal; TEP = Total extraperitoneal

Table 4 Recurrent inguinal and femoral hernia: technique

Type of hernia	<i>n</i>	Surgical approach	Technique (<i>n</i>)
Inguinal monolateral	977	Open inguinal Preperitoneal Laparoscopic	Trabucco-Lichtenstein (819) Wantz-Nyhus (91) TAPP (67)
Inguinal bilateral	147	Open inguinal Preperitoneal Laparoscopic	Trabucco-Lichtenstein (61) Stoppa (47) TAPP (39)
Femoral	46	Open inguinal Laparoscopic	Plug-mesh (34) TAPP (12)

TAPP = Transabdominal preperitoneal

Table 5 Recurrent inguinal and femoral hernia: anesthesia

Type of hernia	Surgical approach	General anesthesia (%)	Locoregional anesthesia (%)	Local anesthesia (%)
Inguinal monolateral and bilateral	Open	35.3%	45.5%	19.2%
	Laparoscopic	96%	4%	—
Femoral	Open	20.5%	59%	20.5%
	Laparoscopic	100%	—	—

Table 6 Hospital stay

Type of hernia	<i>n</i>	Ambulatory surgery (%)	1-day surgery (%)	Ordinary surgery (%)
Primary monolateral	13,819	12%	20%	68%
Primary bilateral	1,285	3%	14%	83%
Primary femoral	661	7%	20%	73%
Recurrent hernias	1,170	5%	12%	83%
Total	16,935	—	—	—

Hospital stay for each group of patients is reported in Table 6.

All centers investigated employed polypropylene mesh in 99% of cases; other prosthetic materials were only occasionally used. Fifty-four out of 105 (51.4%) of centers replied concerning the incidence of postoperative recurrences: in 50/54 (92.5%) of centers, the overall incidence was between 0.1 and 3%; in the remaining four centers, incidence of postoperative recurrence was between 3 and 5%.

Discussion

The Bassini repair and its several variants dominated the first half of the 20th century. All of these repairs have suture lines after defect closure, which are presumably under tension because the defect edges are approximated instead of being bridged by a prosthesis.

By the second half of the century, surgeons began to change their attitudes regarding their approach to inguinal herniorrhaphy for two reasons: 1) high incidence of postoperative recurrence, even in the hands of experts, which ranged from 1 to 25% [4, 5] and 2) the morbidity, most notably acute and chronic postoperative pain, was higher than generally reported [4].

These aspects, the use of prosthetic materials, and the widespread acceptance of the tension-free concept have changed the surgical approach to inguinal hernia repair; during the last decade in Italy and in all of Europe, except Germany, the Netherlands, and Switzerland, Shouldice and Bassini operations were progressively reduced, and the tension-free technique was employed in the majority of cases [6, 7]. This attitude has dramatically reduced the incidence of postoperative recurrences to 0–2% [8].

The widespread use of the tension-free technique is confirmed in our study. In Lombardy, in the year 2000, 16,935 operations for inguinal and femoral hernia were performed; in 97.3% of cases mesh was employed, and in

only 2.7%, a simple closure of parietal defect was performed, with an overall incidence of recurrences between 0.1 and 3%.

The tension-free techniques—open inguinal, open preperitoneal, and laparoscopic—are the procedures of choice in all patients of this study with primary bilateral inguinal hernia, with recurrent inguinal and femoral hernia, and in patients older than 18 with primary monolateral inguinal hernia.

For primary femoral hernias, the surgical approach was a little different; more than one-third of operations were performed with a simple closure of wall defect, without mesh, and the reason for this attitude is not clear.

In the mesh-treated patients, the anterior inguinal approach was used in the majority of cases, and Trabucco and Lichtenstein operations were the techniques of choice—used in more than 80% of cases—in primary monolateral, bilateral, and recurrent monolateral inguinal hernia.

A similar attitude is reported in an audit of 5,038 patients undergoing groin hernia repair, conducted by the Royal College of Surgeons of England [6], in which more than 80% of cases were operated on with an open anterior approach (Lichtenstein operation in 70% of cases) and in a recent review [2], which considered 15 randomized studies of literature.

In bilateral recurrent hernias, the surgical approach is different; preperitoneal technique, open and laparoscopic, was used in the majority of cases. The open preperitoneal repair techniques—Stoppa, Wantz, and Nyhus operations—were used in a few cases only; their role is limited to the primary bilateral and monolateral recurrent inguinal hernia group and in particular in the bilateral recurrent hernia.

Similar results are published by an Italian group [9], and the reasons are probably because open preperitoneal hernia repair is technically a difficult operation, which requires a more extensive surgical dissection with a higher rate of postoperative morbidity than the open

inguinal approach with a similar rate of recurrences. Postoperative recurrences after Stoppa operations are reported at between 0.3 and 4% and can be attributed to technical errors, more often related to the size and placement of the mesh [10].

On the other hand, the preperitoneal approach has the advantage of avoiding the risk of ileoinguinal or genitofemoral neuralgia, permitting excellent visibility, and providing the possibility of dealing with bulky and complex hernias or performing concomitant procedures [11]. Laparoscopic hernia repair is performed in only 20/105 surgical departments that we investigated, and only approximately 10% of patients are operated on using this technique.

A different attitude was seen in a recent review from Sweden [12] and in a study by a surgical group from Stuttgart, Germany [13], where 21% and 98%, respectively, of all inguinal hernia operations were performed with this technique.

In our study, a laparoscopic technique was employed in particular for primary and recurrent bilateral inguinal hernia and less frequently for primary and recurrent monolateral and for femoral hernia.

The reported advantages of this approach are the possibility to visualize both inguinal rings and magnification of surgical anatomy, less postoperative discomfort, and a faster return to normal activities. The disadvantages are: it is a more difficult surgical technique, it has a long learning curve, it has more serious postoperative complications, and there is a longer operative time and necessity of general anesthesia [4, 6, 7].

Recently, a prospective trial showed a superiority of the laparoscopic approach compared to the open tension-free technique in terms of postoperative pain and rehabilitation but a mean operative time significantly longer in the laparoscopic group [7]. No differences in terms of postoperative recurrences rate between the laparoscopic and open tension-free hernia repair are reported [5].

Locoregional anesthesia is the technique of choice for about 50% of all patients operated on for hernia, and it is employed without any significant difference in all groups, regardless of surgical technique employed, except the laparoscopic group.

Some studies [14, 15] report that all patients with primary monolateral inguinal hernia are treated under local anesthesia: in our series, in only 30% of these patients local anesthesia was employed; local anesthesia is used only occasionally in primary bilateral, and recurrent hernia, and it is never used in primary bilateral hernia, in primary femoral hernia, and in recurrent hernia approached with the preperitoneal or laparoscopic technique.

General anesthesia is, on the contrary, the procedure of choice for the laparoscopic approach, except in a few cases. It is used in more extensive ways in patients with bilateral or recurrent hernia, in particular, treated with the preperitoneal approach.

If we consider hospital stay, 23% of all our cases were treated with ambulatory or 1-day surgery, while the remaining 77% had a hospital stay of two nights (Table 6). These data are different from a recent Italian study [15] in which more than 1,000 patients with primary monolateral inguinal hernia were treated under local anesthesia in 1-day surgery.

In the future, we expect an increase in this percentage because, according to new guidelines, primary hernia must be treated as ambulatory or 1-day surgery. In the present report, the great majority of centers employed polypropylene mesh in hernia repair because of the previously documented advantages of this material [16].

This study suggests that the state of the art in the year 2000 in Lombardy was:

1. Hernia repair must be performed using the tension-free technique, Lichtenstein and Trabucco operations in particular.
2. Polypropylene mesh is in widespread use in all centers.
3. The inguinal anterior approach is the one of choice for both primary and recurrent inguinal hernias.
4. The open preperitoneal and the laparoscopic approach are not widely diffused, and their role is limited to bilateral or recurrent hernias.
5. Local anesthesia and 1-day procedures are only used in particular for primary monolateral inguinal hernia.

Appendix

The Lombardia Hernia Study Group

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