SEMCH
Sekce endoskopické a miniinvazivní chirurgie, Ceská republika
Society of Endoscopic and Miniinvasive Surgery, Czech Republic

PREZIDENT VÝBORU

MUDr. Stanislav Czudek, CSc.
Nemocnice Podlesí
739 61 Trinec

CLENOVÉ VÝBORU
MUDr. Michal Cierny, CSc.
Úrazová nemocnice
662 50 Brno

MUDr. Jan Dostalík, CSc.
Mestská nemocnice
728 80 Ostrava – Fifejdy

MUDr. Václav Drahonovský
Mestská nemocnice
Alšova 462
277 11 Neratovice

Prof. MUDr. Miloslav Duda,DrSc.
II. chirurgická klinika FN
776 00 Olomouc

Doc. MUDr. Martin Fried, CSc.
I. chirurgická klinika VFN
2808 Praha 2

Doc. MUDr. Miroslav Ryska, CSc.
IKEM Transplant. Chirurgie
142 00 Praha 4

MUDr. Michael Vraný
Nemocnice
466 01 Jablonec nad Nisou

Prof.MUDr. Jindrich Vomela,CSc.
Chirurgická klinika FN
639 00 Brno

October 1st, 2001

Dear directeur,

I am very sorry to send to you the paper about "New method of laparoscopic inguinal hernioplasty" using your meshes - so late. I was very busy and I had to take part in a lot of Congresses last time. We are very advanced in this kind of surgery and I think it is for you (and your company Cousin) most important results - that is I would like ask you to help with publishing it in the HERNIA. (we discussed about it in Milano, June, 2001).

Thank you very much. Don´t hesitate to contact me in any problems.

Sincerely yours

Stanislav Czudek, MD, PhD.
President of Society of Endoscopic and Miniinvasive Surgery,
Czech Republic

P.S. There are advanced experiences with your polyester silicone impregnated meshes in all over the world.

Photos

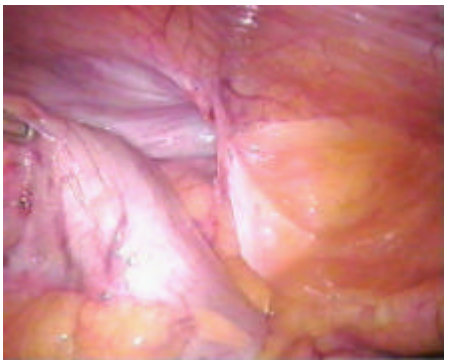


Fig. 1: Left-side indirect inguinal hernia of type IIIb by Nyhus classification

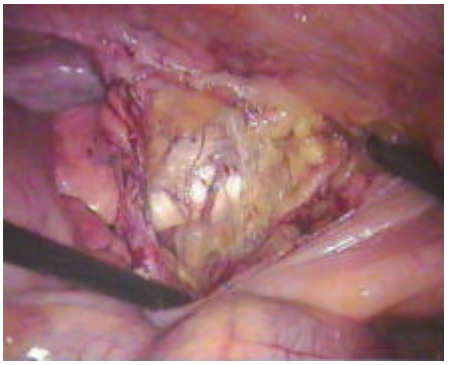


Fig. 2: Left side - Cooper´s ligament

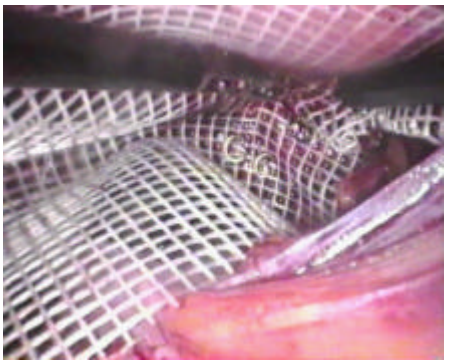


Fig. 3: Fixing of the mesh to Cooper´s ligament by 2 tackers

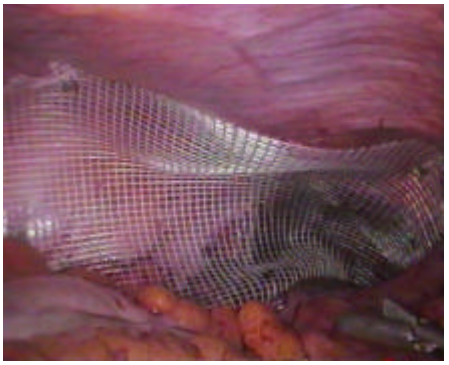


Fig. 4: The mesh is completely stabilised and our intervention is finished.

SEMCH
Sekce endoskopické a miniinvazivní chirurgie, Ceská republika
Society of Endoscopic and Miniinvasive Surgery, Czech Republic

NEW METHOD OF LAPAROSCOPIC INGUINAL HERNIOPLASTY – TOM (TRANSABDOMINAL ONLAY MESH)

Czudek S., Mec V., Ríha D., Matloch J., Branný J.

Centre of Miniinvasive Surgery, Hospital Podlesí, 739 61 Trinec, Czech Republic

Abstract

Aim: The authors present a new type of laparoscopic inguinal hernioplasty – TOM (Transabdominal Onlay Mesh), which shortens time of operation, reduces financial expenses and it is safer and less demanding for the patient.

Materials and methodology: In our hospital there were operated 774 inguinal hernias (663 men and 58 women, average age 49,1 years) with this method. In all cases we applied silicon impregnated polyester net.

Results: Average operating time was 19,3 min. in case of unilateral inguinal hernia and 28,2 min. in case of bilateral inguinal hernia. We did not register any serious complications before or after operations, so far we encountered two relapses with this method, which makes 0,3%. Follow up period is from 1 to 32 months.

Conclusion: We foresee that this approach to inguinal hernia operation will become a favoured method as it is simple, cheap and safe for patients.

Key words:
inguinal hernia – laparoscopic operation – silicon – adhesion – operation time – one-day surgery – hernia centre.

Nowadays are applied tension free methods, which are world-widely used in inguinal hernia operations (Stoppa/3,21/, Mesh Plug – Rutkow/11/, Lichtenstein/1,5/Prolene Hernia System, Trabucco method). During tension free laparoscopic operations of inguinal hernia are mostly applied methods TAPP (TransAbdominal Pre Peritoneal) and TEP (Total Extra Peritoneal) /4/. In both methods the mesh is not in contact with organs of abdominal cavity at the end of operation. In our hospital we used TAPP method with the prolene mesh. In case of recurrent inguinal hernia (second, third, fourth, fifth, sixth recurrences) it was impossible to perform a perfect peritonealisation because of the lacking free peritoneum /14,19/. In such cases part of the net touches intestinal loops. That is why we have decided to use silicon impregnated polyester mesh, as it proved to be inert in contact with human tissue (see breast epithesis). Due to the fact that we did not register any complications because of the mesh adhesion, necrosis, or intestine perforations – we decided on a method which varies from those mentioned above. In the final part of operation we fix the mesh to solid area of inguinal hernia structures and thus it is settled intra-peritoneally so it is in contact with organs of abdominal cavity. Such approach – TOM (Transabdominal Onlay Mesh) to inguinal hernioplasty, is apparently similar to IPOM method (Intra-peritoneal

Onlay Mesh). It crucially differs from the IPOM method, in TOM approach it is necessary to dissect free the compact hernia structures – Cooper's ligament.

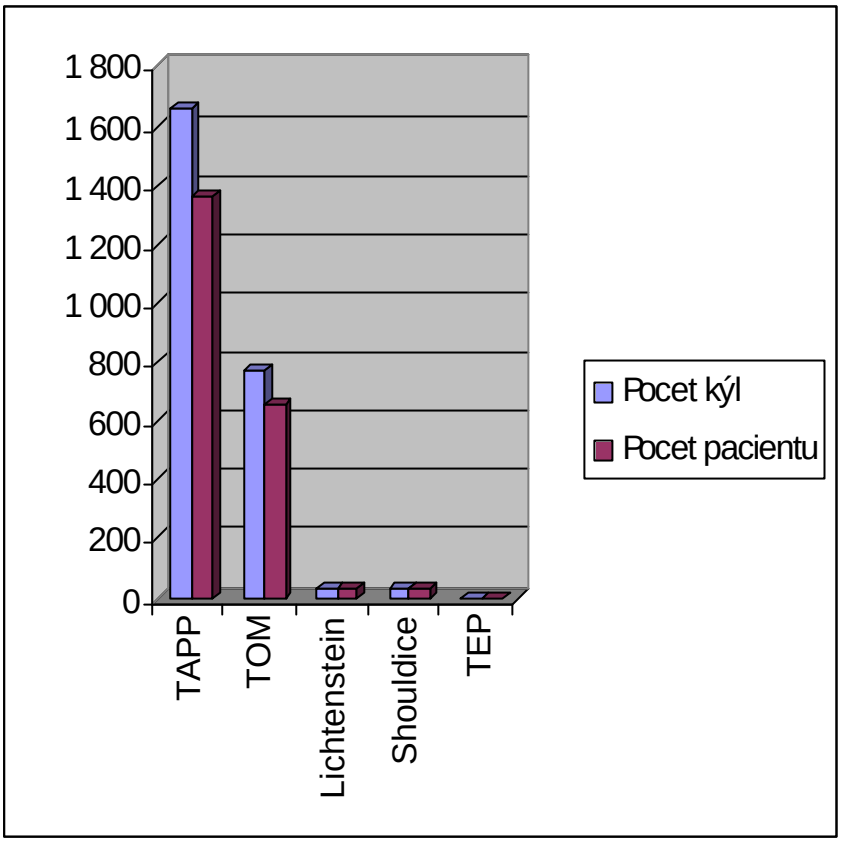
Silicon is a material that is stable and widely used on the surfaces of implants in human body for long-term. It is excellently tolerated and our study proves it too.

Materials and Methodology

Since October 1992 till August 2001 were operated 2497 inguinal hernias on 2079 patients in our Centre of Mini-Invasive Surgery in the Hospital Podlesí – see graph nr. 1 and chart nr. 1. Out of 2497 inguinal hernias on 2079 patients we operated 1665 hernias with TAPP method on 1356 patients /4/, 774 hernias with TOM method on 663 patients, 31 hernias with Lichtenstein method on 29 patients/1/, 28 hernias with Shouldice method on 28 patients /8,12/ and 3 hernias with TEP method on 3 patients. Method TOM was introduced in January 1999 and since that time we applied it on 774 hernias on 663 patients, out of that 605 men and 58 women, average age 49,1 years. Due to the over-regional character of CMS, the number of complicated cases resulted in 9,3% of recurrences (72 hernias), which were dealt with TOM plasty even (sixth recurrence).

Chart number 1

Methods	TAPP	TOM	Liechtenstein	Shouldice	TEP
Number of inguinal hernias (2497)	1665	774	31	28	3
Number of patients (2079)	1356	663	29	28	3



Graph number 1

number of inguinal hernias

number of patients

Indication to operation

In our hospital we choose laparoscopic inguinal hernia plasty for all patients who are not contra-indicated by anaesthesiologists and are older than 18 years /2, 9, 10, 15/. Since 1992 till 1999 we used the TAPP method, since 1999 we have been using the TOM method. In case of incarcerated hernia, individual judgement of surgeon and anaesthesiologist is necessary.

Questionnaires

In order to get subjective and objective evaluation of operative and post-operative period we have created a special questionnaire (chart nr. 2), in which are presented the most crucial data connected with patient, operation and convalescence period /6, 20/. This questionnaire we send to general practitioners, they filled

informations concerning patient's convalescence period and they returned the questionnaire back to the Department of Surgery. This questionnaire enables us to gather worth information concerning patient's post-operative period.

Operative Technology

We use 10-mm wide umbilical port for laparoscop and application of mesh, and two 5-mm wide ports placed in medio-clavicular lines – on hernia side in the navel level and contra-laterally a little bit lower. Position of all three ports is to some extent individual as we take into consideration patient's antropometry and other conditions (underwent operations, presumed concretions, etc.). We try to keep our equipment in 90° of working angle. Then we examine abdominal cavity and consider the following approach, which depends on the type of inguinal hernia in accordance with Nyhus classification. In all cases it is crucial to visualise stable structures in the inguinal hernia area, which is Cooper's ligament. That is why we begin the operation with dissection of Cooper's ligament. Then we proceed to the next phase, in which we adjust the surrounding area for mesh insertion. We preparate the sac of small hernia and haul it into the abdominal cavity, in other cases we do not preparate sac, we only partially haul it into the abdominal cavity and fix its wall to Cooper's ligament. The rest of sac we leave in the hernial canal, where it does not make any irritations to the patient. The occurrence of postoperative hydrocele in the left sac is due to the drainage back to the abdominal cavity practically impossible. If sigmoid adhesion or small vein block loose mesh placement, we choose a horizontal discission of peritoneum and its shift towards pelvic fundus together with colon. In the next phase we apply mesh through 10 mm port into the abdominal cavity, we place it on the place previously preparated and we fix it to the Cooper's ligament with two tackers. The mesh extent is minimally 15x10 cm. In case of small inguinal hernias, types II. and III. a. in accordance to Nyhus classification, further fixation is not necessary. In case of big inguinal hernias we fix mesh around borders with tackers and in type III. b. we apply transparietal stitches for upper quadrants. That was all for the mini-invasive performance. An important condition, which is a part of protocol after a laparoscopic hernia plasty is mobilisation of the patient in the evening of the day of operation. This will positively influence the process of peristaltic regeneration and thus will reduce the possibility of adhesion. The patient may consume liquids and can be displaced to the home care (one-day surgery).

Results

In the study were classified 663 patients, on whom 774 plasties with TOM method were performed. None of them had incarcerated hernia. In 552 cases was performed one-sided plasty, in 111cases bilateral. The average time of operation was 19,3 respectively 28,2 min., the average length of hospitalisation was 2,3 days without connection to the type of plasty – one-sided or bilateral, or primary or recurrent hernia. Nobody died due to operation. There were two re-operations: due to haemoperitoneum and ileus. Haemoperitoneum was solved by rinsing and drainage – without discovery of the bleeding source (patient with anticoagulation), ileus was after

laparoscopic revision judged as paralytic (without adhesions) and conservative therapy helped to adjust the state. The follow up time is 1 – 32 months. A week after operation the patient was examined in the Surgical Department, 1 month and 3 months after the operation the patient was checked by his general practitioner. In case of any complication the patient should come to the surgical control. Questionnaire results are marked in chart number 2. As You can see, analgesics were minimally used and after patient dimission only exceptionally. An average period, after which patients were able to come back to the daily routine, was 4 days. After 14 days patients were able to endure great physical burden. It can be concluded that the postoperative course was better in case of inguinal hernia, type II. and III.A. in comparison to type III.B.

Chart number 2

I. Name, surname	Jirí Novák
Age	51
Sex, height, weight	Male, 182cm, 95kg
Profession	Driver
Period of complaints	3 years
II. ASA	II.
Associated diagnosis	Bronchitis chronica, Hypertension
Operation length	27 min.
Operation development, complication	I. **II.** III.
Nyhus	I. **III.a.** III.B. III.c. IV.
Complications: local Total	Bleeding (a. epigastric inf.) 0
Analgesics: kind Length of usage	Indometacin supp. 100 24 hours
Surgeon comments	–
Length of hospitalisation	2 days
Hernia	**Type** **Orificium** **Sac**
	Direct Large Large **Indirect** **Medium** **Medium** Femoralis Small Small obturatoria
III. Convalescence	
Pains	4 days
Analgesics	1day
Return to daily routine (days) (walks, shopping, car driving, …..)	5 days
Great physical burden (days)	11 days
Patient comments	Very good experience
GP comments	Very good experience

Discussion

TOM hernioplasty is a method which is very considerate towards patients if we compare it with other methods of inguinal hernioplasty. It can be applied to all patients, which can undergo a laparoscopic performance. The silicon impregnated polyester mesh that we use is not expensive. Short time of operation is also for the patient beneficial. Furthermore the postoperative course is in accordance to subjective and objective judgements of patients and doctors better. At the end we would like to highlight that concentrating of operations into the so called hernia centres has a positive influence on the success of operations and its utility can be documented even now.

References:

1) Amid PK, Shulman AG, Lichtenstein IL (1994) Die Herniotomie nach Lichtenstein. Chirurg *65:54-58*

2) Barkun JS, Wexler MJ, Hinchey EJ, Thibeault D, Meakins JL (1995) Laparoscopic versus open inguinal herniorrhaphy: preliminary results of a randomized controlled trial. Surgery 118:703-710

3) Champault GG, Rizk N. Catheline J-M et al (1997) Inguinal hernia repair. Totally preperitoneal laparoscopic approach versus Stoppa operation: randomized trial of 100 cases. Surg Laparosc Endosc 7(6):445-450

4) Cohen RV, Alvarez G, Roll S, Garcia ME, Kawahara N,Schiavon CA, Schaffa TD, Pereira PR Margarido NF, Rodrigues AJ (1998) Transabdominal or extraperitonel laparoscopic hernia repair? Surg Laparosc Endosc Aug 8:264-268

5) Davies N, Thomas M, Mc Ilroy M, Kingsnorth AN (1994) Early results with the Lichtenstein tension-free hernia Br J Surg 81:1478-1479

6) Filipi CJ, Gaston-Johansson F, McBride PJ, Murayama K, Gerhardt J, Cornet DA, Lund FJ, Hirai D, Graham R, Patil K, Fitzgibbons R Jr, Gains RD (1996) An assessment of pain and return to normal activity. Laparoscopic herniorrhaphy vs open tension –free Lichtenstein repair. Surg Endosc 10:983-986

7) Friis E, Lindahl F (1996) The tension-free hernioplasty in randomized trial. Am J Surg172:315-319

8) Hay J-M, Boudet M-J, Fingerhut A, Pourcher J, Hennet H, Habib E, Veyrieres M, Flamant Y (1995) French Asso for Surgical Research: Shouldice inguinal hernia repair male adult: the gold standard? A multicenter controlled in trial 578 patients. Ann Surg 222:719-727

9) Johansson B, Hallerback B. Glise H et al (1997) Laparoscopic mesh repair vs open repair w/wh mesh graft for inguinal hernia (SCUR hernia repair study) preliminary results. Surg Endosc 11:170

10) Johansson B, Hallerback B, Glise H, Anesten B, Smedberg S, Roman J (1999) Laparoroscopic mesh versus open preperironeal mesh versus conventional technique for inguinal hernia repair: a randomized multicenter trail (SCUR Hernia Repair Study) Ann Surg 230:225-231

11) Khoury N (1998) A randomized prospective controlled trial of laparoscopic extraperitoneal hernia repair and mesh-plug hernioplasty: a study of 315 cases. J Laparoendosc Adv Surg Tech A 8:367—372

12) Kingsnorth AN, Gray MR, Nott DM (1992) Prospective randomized trial comparing the Shouldice technique and plication darn for inguinal hernia. Br J Surg 79:1068-1070

13) Lawrence K, McWhinnie D, Goodwin A, Doll H, Gordon A, Gray A, Britton J, Collin J (1995) Randomised controlled trial of laparoscopic versus open repair of inguinal hernia: early results. BMJ 311:981-985

14) Leibl B, Schwarz J, Däubler P, Kraft K, Bittner R (1996) Endoskopische Hernienchirurgie (TAPP) - Goldstandard in der Versorgung von Rezidivhernien? Chirurg 67:1226-l230

15) Lorenz D, Stark E, Oestreich K, Richter A (2000) Laparoscopic hernioplasty versus conventional hernioplasty (Shouldice): results of a prospective randomized trail. World J 24:739-745

16) Maddern GJ, Rudkin G, Bessell JR, Devitt P, Ponte L (1994) A comparison of laparoscopic and open hernia

repair as a day surgical procedure. Surg Endosc 8:1404-1408

17) MRC Laparoscopic Groin Hernia Trail Group (1999) Laparoscopic versus open repair of groin hernia: a randomised comparison. Lancet 354:185-190
18) Payne JH, Grininger LM, Izawa MT, Podoll EF, Lindahl PJ, Balfour J (1994) Laparoscopic or open inguinal herniorrhaphy? A randomized prospective trial. Arch Surg 129:973-98l
19) Scheyer M, Zimmermann G (1996) Retrospective failure analysis in laparoscopic hernia repair possible hecause of routine video documentation. Surg Endosc 10:842-844
20) Schrenk P, Woisetschlager R, Rieger R, Wayand W (1996) Prospective randomized trial comparing postoperative pain and return to physical activity after transabdominal preperitoneal, total preperitoneal or Shouldice technique for inguinal hernia repair. Br J Surg 83:1563-1566
21) Stoppa RE, Warlaumont CR (1989) The preperitoneal approach and prosthetic mesh repair of groin hernia. In: Nyhus LM. Condon RE (eds) Hernia. Lippencott, Philadelphia. Pp199-225
22) Töns C, Muck-Tons A, Schumpelick V (1993) Leistenhernienchirurgie in Deutschland 1992: eine Umfrage an 1656 deutschen Kliniken. Chirurg 64:635-641
23) Vogt DM, Curet MJ, Pitcher DE, Martin DT, Zucker KA (1995) Preliminary results of a prospective randomized trial of laparoscopic onlay versus conventional inguinal herniorrhaphy. Am J Surg 169:84-90
24) Wellwood J, Sculpher MJ, Stoker D, Nicholls GJ, Geddes C, Whitehead A, Singh R, Spiegelhalter D (1998) Randomised controlled trial of laparoscopic versus open mesh repair for hernia:outcome and cost. BMJ 317:103-110