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Original Research Article

Nigam's inverted curtain hernioplasty: a modified lichtenstein tension free hernioplasty for inguinal hernia

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ABSTRACT

Background: It is an open tension-free hernioplasty for primary inguinal hernias using minimal dissection and only 3 sutures to fix the mesh.
Methods: A description of operative technique and patient's demographics are presented.
Results: 362 repairs were done with this technique over a period 18 years (March 2000 to March 2018). All were primary uncomplicated inguinal hernias.
Conclusions: NICH tackles the both known aetiological factors for recurrence i.e., weakness in inguinal floor and tension at the suture line. It involves minimal tissue dissection and least number of sutures. Two sutures are used to fix the mesh with inguinal ligament. Third suture is used to make an artificial deep inguinal ring in the mesh as well as used to narrow the natural deep inguinal ring to further avoid recurrence. No suture is applied in main body of mesh which remains free like an inverted curtain covering the whole hernia susceptible region of groin. Prolene mesh is used which completely covers the potentially weak area on the floor of inguinal region irrespective of the size of the area in small or big frame persons. Semi double breasting of external oblique aponeurosis avoids displacement of mesh. NICH is associated with least recurrence, less post-operative pain, less post-operative complications and short learning curve.

Keywords: Hernioplasty, Inguinal hernia, Inverted curtain, Minimal dissection, Recurrence, Semi-double breasting, Tension-free

INTRODUCTION

Nigam's Inverted Curtain Hernioplasty (NICH) is a minimal dissection tension-free hernioplasty for inguinal hernias. It is based on the principles of Lichtenstein's tension-free hernioplasty. It is a simple technique using minimum number of sutures with least recurrence and complications. In this technique polypropylene mesh covers hernia prone area of inguinal floor with almost no tension at suture line.[1] Mesh is fixed at its lower part and rest of the mesh remains free like an inverted curtain. One suture serves two purposes at the same time by narrowing the natural deep inguinal ring as well as making a new deep inguinal ring of the mesh by fixing the two crura of the mesh, this reduces the risk of recurrence. A semi-double breasting of external oblique aponeurosis is done to keep the mesh in place. This procedure can be done under local anesthesia or regional anesthesia.[2]

In our series with this technique we had one recurrence and some minor complications only.

METHODS

A total of 362 repairs were done in 352 patients (primary uncomplicated indirect, direct and bilateral inguinal hernias), by NICH between 01 March 2000 and 01 March 2018 (Table 1), in various hospitals of Gurugram, Haryana, India. All patients were diagnosed as uncomplicated primary indirect or direct inguinal hernia by clinical examination. Informed consent was taken from all patients. All patients were operated by same NICH technique.

Table 1: Patients and hernia characteristics.

Total	362	%
Mean age	41	
Male	334	92.26
Female	18	04.97
Right Side	262	72.37
Left Side	80	22.09
Bilateral	10	02.76
Indirect inguinal hernia	268	74.03
Direct inguinal hernia	84	23.20
Under Local Anaesthesia	64	17.67
Under Spinal Anaesthesia	196	54.14
Under Epidural Anaesthesia	24	06.62
Under General Anaesthesia	68	18.78
Recurrence	1	0.276

The patients were prepared for the procedure in the conventional method and surgery was performed under local, spinal or general anaesthesia.

After the skin incision, the external oblique aponeurosis was incised above the midline of superficial inguinal ring so as to help in semi double breasting of external oblique aponeurosis. The area where the mesh was to be placed (the mesh bed) was prepared by making space between external oblique aponeurosis and internal oblique muscle with finger wrapped up with gauze. Similarly, the space on the medial and lateral sides was also created. Care is taken to avoid injury to ileoinguinal, ileohypogastric nerves.

Identification and management of the inguinal hernia sac and it's contents was done properly while also looking out for a femoral hernia. Indirect inguinal hernia sacs were transfixed and excised. If a large inguinoscrotal sac was present then sac was cut in inguinal canal and distal part of sac was not dissected out and was left intact. Direct inguinal hernia sacs were reduced and plicated.

In all cases a 15 x 15 cm polypropylene mesh was used and 2-0 polypropylene suture was used to fix the mesh.

First suture, using 2-0 polypropylene suture, was applied at the fascia above pubic tubercle allowing 2 cm of mesh to go beyond it. Pubic tubercle bone was not pierced by needle. Second suture, using 2-0 polypropylene suture, was taken through the inguinal ligament just below the deep inguinal ring. The lateral margin of the mesh was cut at two cms from the lower margin to make a slit. The spermatic cord was taken out from this slit making an artificial deep inguinal ring from the mesh. Third suture, using 2-0 polypropylene suture, was applied to the two cruras of natural deep inguinal ring as well as to the two crura of prolene mesh. This narrowed the deep inguinal ring and displaced the cord medially. As a result the mesh was fixed to the lateral margin of the deep inguinal ring. This third suture serves following purposes: narrowing of deep inguinal ring, formation of new deep inguinal ring of mesh, fixation of mesh to deep inguinal ring prevents recurrence, the newly formed ring fits snugly around the cord at deep inguinal ring thus preventing any protrusion of preperitoneal tissue and recurrence.

Then the mesh was cut and shaped according to the space available and size of myopectineal orifice of Fruchaud. The mesh should extend at least three cms beyond the deep inguinal ring laterally and five cms beyond the lower edge of the arching fibres of internal oblique muscle and two cms beyond the pubic tubercle. Finally, the mesh was pushed in the space made for it between the external oblique aponeurosis and internal oblique muscle. It is now neatly spread without wrinkles. No suture is applied to fix the main body of mesh, which remains free like an inverted curtain. Any change of posture, from lying position to standing or walking and running will not put any extra focal strain on the mesh causing maldistribution of tension, leading to wrinkles and dead space formation. The external oblique aponeurosis was then closed with 2-0 polypropylene suture in a semi double breasting manner. The margin of the upper flap was sutured with the lower flap one cm inferior to the margin, on the outer surface. The free margin of the lower flap remains free under the upper flap. This can also be done by inserting the upper flap under the lower flap. The suturing was started at the lateral end of the wound semi-double breasting of external oblique aponeurosis tightens external oblique aponeurosis a bit and gives support to the mesh to further stick to soft tissues underlying quickly, to keep it in place and not to get displaced.

The wound was closed in the conventional manner. Subcutaneous plane was closed by 2/0 vicryl interrupted sutures. Skin was closed by staples. Betadine soaked gauze dressing was applied over wound in every case. Patient was discharged within 24 hours. Ambulation was not restricted. Patients were advised to take oral antibiotics and analgesics for 3 to 5 days. Patients were called for follow-up on the 8th post-operative day. Sutures were removed on the eighth to tenth post-operative day.

RESULTS

Post-operative discomfort was treated with anti-inflammatory drug ibuprofen, 400 mg thrice daily. Most

patients took analgesics and anti-inflammatory drugs for 3-5 days. 338 patients (96.02%) returned to work from the 4th to 12th post-operative day depending on their occupation. This series of 362 operations by NICH showed low recurrence i.e., 0.27%, although a larger series is required to further strengthen the low recurrence following NICH. 2 patients (0.57%) developed post-operative neuralgia which continued for 2-3 months after operation and then gradually subsided. The cause was not known. No case (0%) required removal of mesh due to infection or any other reason. No (0%) serious complications were observed in this series. Most of the patients who developed minor haematomas and bruising were on aspirin.

Table 2: Patients demographics and post-operative course.

	Patients (%)
Completed follow-up for 4.5 to 5 years	14 (3.86)
Completed follow-up for 2 years	216 (59.66)
Completed follow-up for 12 months	26 (7.18)
Completed follow-up for 4 months	28 (7.73)
Completed follow-up for 21 days	58 (16.02)
Post-operative discomfort and pain for 2-3 weeks	10 (2.76)
Seroma	04 (1.10)
Minor haematomas	12 (3.31)
Haematoma requiring surgery	0 (0)
Minor wound infection	4 (1.10)
Wound infection requiring surgery	0 (0)
Bruising	2 (0.55)
Neuralgia	2 (0.55)
Recurrence	1 (0.27)
Removal of prosthesis due to infection or other causes	0 (0)
Stitch abscess	6 (1.65)

DISCUSSION

Complications seen in this series of NICH are minor complications. No major complication occurred. Wound infection, seroma, discomfort and restriction of abdominal wall mobility are well known complications of mesh.[3-5] 10 patients (2.84%) in this series complained of post-operative discomfort and pain for 2-3 weeks which subsided gradually with analgesics. There is evidence that 30% of patients of various hernia surgery have some degree of discomfort or pain even one year after operation. The cause of pain is usually not known in this cases.[6] Two patients had neuralgia which lasted for three months. Two patients developed bruising along the incision area which took about three weeks to disappear. These patients were on aspirin for six preceding years. Study shows that "the tension free repair" (regardless of the approach) is associated with minimal discomfort which results in a faster recovery and return to normal activities.[7] Minor haematomas developed in 12 (3.40%) patients but did not require surgery and gradually subsided. No patient (0%) developed major haematoma. All 12 cases (3.40%) of haematoma had been on aspirin for more than three years although this was stopped one week prior to surgery. Two patient (0.57%) developed wound infection in the form of cellulitis around the incision which subsided with treatment. The antibiotic was extended for three more days. No case (0%) developed major wound infection. One patient (0.27%) developed recurrence. In no case (0%) was the mesh required to be removed. Most of the recurrences after prosthetic hernioplasty occur in early post-operative period.[8,9] In this series the follow-up was up to five years. It is reported that these meshes contain a slit and that permits indirect peritoneal protrusion. NICH does not allow this to happen as the newly formed ring of mesh is anchored with the natural deep inguinal ring which seals it around spermatic cord leaving no space for a hernia or peritoneal protrusion.

Trabucco introduced the concept of "sutureless" hernioplasty technique and is of the opinion that if sutures are applied to the mesh, a maldistribution of tension may be created and dead spaces formed.[10]

NICH leaves most of the mesh free and without sutures so as to avoid maldistribution of tension on the mesh and dead space formation. NICH enjoys the advantages of both the suture and suture less mesh hernioplasty. Less number of sutures has these advantages i.e., no nerve trapping, no maldistribution of tension, not much post-operative discomfort and when patient stands, walks and runs there is no tension on mesh. NICH has these advantages due to having the least number of sutures.[11,12]

Moreover semi double breasting of the external oblique aponeurosis helps in the these manners. It produces soft padding pressure over the mesh and the dissected area, hence; helps in haemostasis, and thus reduces haematoma and seroma formation, mesh remains flat without wrinkles, avoids folding and displacement of mesh and avoids dead space formation.

Several large studies indicate that excellent results from open tension-free operation are less dependent on the experience of the surgeon, and more on the simplicity of the operation and a short learning curve.[9,11]

NICH has a short learning curve and can be easily adopted by beginners. It can easily be learned and performed. NICH technique can be applied to both direct and indirect inguinal hernia. This makes it simple and easy to adopt.[3,13] Majority of patients return to normal activity in one week in both open and laparoscopic surgery.[14,15] In NICH the majority of patients regained normal activity between 4-12 days. Day surgery is safe, efficient, effective and is accompanied by lower incidence of hospital acquired infection and earlier return to normal activity than inpatients NICH also promotes day care surgery.[16] Nowadays, time to recovery and cost are also important than only recurrence NICH takes care of man hour loss as well as the economics.[17] 41.6% of women previously operated for an alleged direct or indirect inguinal hernia were found to have a femoral hernia at re-operation (4.6% in men). The reason for increased incidence of femoral recurrence after a previous inguinal hernia repair in women is unknown.[18] By NICH, we have not seen any femoral hernia in 5 year follow-up.

NICH is a simple procedure developed by the authors. It is an easy, less time-consuming and economical technique giving good results in relation to post-operative pain, discomfort, complications and recurrence. Further studies on this technique should be done to validate the advantages make it a routine procedure for open repair of primary uncomplicated inguinal hernia.

CONCLUSION

NICH tackles the both known aetiological factors for recurrence i.e., weakness in inguinal floor and tension at the suture line. It involves minimal tissue dissection and least number of sutures. Two sutures are used to fix the mesh with inguinal ligament. Third suture is used to make an artificial deep inguinal ring in the mesh as well as used to narrow the natural deep inguinal ring to further avoid recurrence. No suture is applied in main body of mesh which remains free like an inverted curtain covering the whole hernia susceptible region of groin. Prolene mesh is used which completely covers the potential weak area on the floor of inguinal region irrespective of the size of the area in small and big frame persons. Semi double breasting of external oblique aponeurosis avoids displacement of mesh. NICH is associated with least recurrence, less post-operative pain, less post-operative complications and short learning curve.

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REFERENCES

1. Amid PK, Shulman AG, Lichtenstein IL. Critical scrutiny of the open "tension free" hernioplasty. Am J Surg. 1993;165:369-71.
2. Fitzgibbons RJ, Filipi CJ, Quinn TH. Inguinal hernias. Chapter 36. In: Brunicardi CF, Andersen A, Billiar T, Dunn D, eds. Schwartz's Principles of Surgery. 8th ed. 2005; 1368.
3. Horeyseck G, Pohl C. Lichtenstein-patch repair of recurrent inguinal hernia. Hernia. 1998;2(1):S6.
4. Memon MA, Cooper NJ, Memon B, Memon MI, Abrams KR. Meta-analysis of randomized clinical trials comparing open and laparoscopic inguinal hernia repair. BRJ Surg. 2003;90:1479-92.
5. National Institute for Clinical Excellence. Guidance on the use of laparoscopic surgery for inguinal hernia. Technology Appraisal Guidance No. 18. London: NICE; 2001.
6. Kumar S, Wilson R, Nixon S, Macintyre I. Chronic pain after laparoscopic and open mesh repair of groin hernia. BRJ Surg. 2002;89:1476-79.
7. Amid PK. Lichtenstein tension-free hernioplasty. In: Corcione F, eds. New procedures in open hernia surgery. 1st ed. Napoli, Italia: Springer; 2004: 1-12.
8. Amid PK. Groin hernia repair: open techniques. World J Surg. 2005;29:1046.
9. Wantz GE. Experience with tension-free hernioplasty for primary inguinal hernias in men. J Am Coll Surg. 1996;193:351-60.
10. Trabucco EE, Trabucco AF. Flat plug and mesh hernioplasty in the "inguinal box" description of the surgical technique. Hernia. 1998;2:133-8.
11. Trabucco EE. The office hernioplasty and the trabucco repair. Ann Ital Chir. 1993;64:127-49.
12. Gilbert AI. Inguinal hernia repair: biomaterials and sutureless repair. Perspect Gentile Surg. 1991;2:113-29.
13. Amid PK, Lichtenstein IL. Long term result and current status of the lichtenstein open tension-free hernioplasty. Hernia. 1998;2:89-94.
14. Kark AE, Kurzer M, Belsham P. Three thousand one hundred seventy five primary inguinalhernia repairs: Advantage of ambulatory open mesh repair using local anaesthesia. J Am Coll Surg.1998;186:447-56.
15. Bay-Nielsen M, Nordin P, Kehlet H. Chronic pain after repair of inguinal hernia. BRJ Surg. 2004;91:362-7.
16. Cooke T, Fitzpatrick R, Smith I. Achieving day surgery targets: A practical approach towards improving efficiency in day case units in the UK. London: Advance Medical Publications; 2004.

17. Burney RE, Jones KR, Coon WJ. Core outcome measures for inguinal hernia repair. J Am Coll Surg. 1997;185:509-15.
18. Koch A, Edwards A, Haapaniemi S, Norden P, Kald A. Prospective evaluation of 6895 groin hernia repair in women. BRJ Surg. 2006;2:110-5.

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