SEROMA AFTER TENSION-FREE INGUINAL HERNIA REPAIR – OUR EXPERIENCE

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Conflicts of Interest: Nil

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DOI: <https://doi.org/10.32553/ijmsdr.v5i2.762>

Abstract:

Seroma Is a collection of fluid called serum that gets collected at the site of inguinal hernia surgery. It is common after inguinal hernia repair with a mesh. Usually seroma develops after 7 to 10 day of operation but can develop even earlier depending upon the amount of tissue dissection. More the dissection more the chances of development of seroma. The fluid in seroma is usually clear or straw colored. Seroma generally does not require any treatment; it disappears by absorption by body tissues within few weeks. Large seromas may require repeated aspiration. To avoid developing seroma after inguinal hernia surgery is to do minimal tissue dissection and avoid dead space formation. We operated 400 cases of inguinal hernia by a modified Lichtenstein tension-free procedure called NICH (Nigam's inverted curtain hernioplasty) our incidence of development of seroma was 1.5% against international incidence of 7% which is a real low incidence. We have discussed the ways to avoid formation of seroma after open inguinal hernioplasty.

Keywords: dead space, dissection, inguinal hernia, Lichtenstein, mesh, NICH, seroma.

Introduction:

Seroma is a collection of serum at the site of operation. Seroma is formed due to tissue dissection and can occur in any patient after groin hernia surgery. Use of mesh to cure hernia is also responsible for seroma. Patient of hernia repair with mesh are at higher risk of developing seroma. Seroma appears like a lump in the groin at the site of surgery. It is a self-limiting problem but sometimes requires several aspirations. Aspiration has a danger of introducing infection so aspiration must be done with aseptic precautions, otherwise seroma fluid can become infected & can develop an abscess. General incidence of seroma is reported between 1.2 to 10%. It is due to trauma to the lymphatics due to the surgical dissection. It is felt that abdominal binder reduces the chance of seroma formation as it does not allow it to grow. Daniel B Jones states¹ his experience that "During the years, I have recommended an abdominal binder to potentially decrease the post-operative seroma". Small seroma can heal without any treatment but with reassurance. Larger the hernia larger chance of seroma development. We have operated upon 400 cases of inguinal hernia by modified Lichtenstein's tension free hernioplasty, called Nigam's inverted curtain hernioplasty (NICH).² Seroma developed in only 6 cases (1.5%). The international incidence of development of seroma after groin surgery is approx 7%. In NICH we do minimum tissue dissection, use

minimum sutures to fix the mesh, double breasting of external oblique aponeurosis (it applies pressure and removes dead space) and dressings with Elastoplasts, an elastic adhesive tape. Elastoplasts also applies extra pressure over operation site and helps in preventing dead space formation and seroma formation. These operative steps in NICH help to reduce the incidence of seroma formation.

The size of the collection relates to the amount of dissection done between tissue planes and the amount of empty space in the surgical wound³. The exact pathogenesis of seroma matter of debate. It has been postulated to be due to a local inflammatory response to the mechanical injury incurred by tissue dissection, as well as to the introduction of foreign material into the body⁴. The main risk factors are advanced age big hernia sac, scrotal hernia, and transaction of the sac with distal part left behind. Because it mimics a postoperative recurrence of hernia, seroma has been concern to hernia patients⁵. Seroma formation after laparoscopic inguinal hernia repair is reported with various rates (1.9%-22.9%)^{6,7}.

Seroma formation can be reduced and even prevented by sharp dissection and less cautery, in large indirect hernias transect sac in the inguinal canal rather than complete stripping from spermatic cord structures, always explain the patient specially in big hernias the

possibility of developing seroma post-operatively as it will be a matter of concern for the patient. Putting a drain in large hernia helps to avoid seroma formation. Try to avoid dead space formation in big hernias. In inguino-scrotal hernia put a drain through scrotum. Good haemostasis is must to avoid seroma formation.

Methods

A total of 400 inguinal hernia repairs were done for primary uncomplicated indirect, direct and bilateral inguinal hernias by a modified Lichtenstein tension-free repair, NICH (Nigam's inverted curtain hernioplasty) between March 2000 and December 2020 (Table I), in Max Hospital and some other hospital of grogram, Haryana, India. Informed consent was taken from all patients. All patients were operated by same NICH technique.

All patients were prepared for the procedure in the conventional method and surgery was performed under local, spinal or general anaesthesia. After skin incision, the external oblique aponeurosis was incised above the midline of superficial inguinal ring. 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. This procedure should be done slowly under vision without much force as ileohypogastric nerve can be damaged. A minimal tissue dissection was done keeping in mind the tissue trauma. Indirect inguinal hernia sac was transixed and excised. In large inguinoscrotal hernias the sac was cut in inguinal canal and distal part of sac was not dissectd out and stripped from spinal cord structures. Direct inguinal hernia sac was reduced and plicated. In all cases a15 cm x 15cm polypropylene mesh was used and 2-0 polypropylene sutures were used to fix the mesh. The mesh was cut and shaped according to the space available and size of myopectineal orifice of Fruchaud. Two sutures were used to fix the mesh with inguinal ligament. No suture was applied to fix the main body of the mesh, which remained free like an inverted curtain. The external oblique aponeurosis was then closed with 2-0 polypropylene suture in semi double breasting manner. The margin of the upper flap was sutured with the lower flap one cm inferior to the margin, on the surface. Subcutaneous tissue was approximated with only three absorbable sutures. Care was taken to avoid dead space formation.

The wound was closed in the conventional manner. Povidone-iodine solution soaked gauze dressing was applied over wound in every cas. Elastoplasts, an

elastic tape, used to fix the dressing which applied some pressure to avoid seroma formation. Patients were discharged within 24 hours. Ambulation was not restricted. Patients were advised to takes oral antibiotics 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

In our study of 400 cases of inguinal hernia repaired by NICH tension free repair, men (380, 95%) were more than women (20, 5%). Right inguinal hernia cases (288, 72%) were more than left side (90, 22.5%) and only 12 cases (3%) were of bilateral inguinal hernia. Indirect inguinal hernia cases (304, 76%) were more than the direct inguinal hernia (96, 24%). Spinal anaesthesia was given in more cases, (224, 56%) than other modalities of anaesthesia (Table 1). Seroma developed in only 6 cases (1.5%) out of 400 cases of inguinal hernia operated by NICH (Table 2). No case of seroma required any surgical intervention. One case required three times aspiration and then subsided. No case developed abscess in seroma.

Table 1: Patients and hernia characteristics

Demographics and Characteristics	Number of cases	Percentage of cases
Mean age	44	
Male	380	95%
Female	20	05%
Right side	288	72%
Left side	90	22.5%
Bilateral	12	3%
Indirect inguinal hernia	304	76%
Direct inguinal hernia	96	24%
Under local anaesthesia	68	17%
Under spinal anaesthesia	224	56%
Under epidural anesthesia	30	7.5%
Under general anaesthesia	78	19.5%

(n=400)

Post-operative complications were much less with NICH in this series as compared to Lichtenstein and other procedures. Post-operative discomfort was treated with anti -inflammatory drug, ibuprofen, 400 mg thrice daily. Three hundred eighty four patients (96.96%) returned to work from the 4th to 12th post-operative day depending up on their occupation.

Three patients (0.75%) developed post operative neuralgia (due to nerve damage or irritation) which continued for more than 3 months after operation and then gradually subside. The cause was not known. No case (0%) of required removal of mesh due to infection or any other reason. No patient required neurectomy. No case (0%) serious complication was observed in this series. Most of the patients who developed minor haematomas and bruising were on aspirin. (Table 2)

Table 2: Post-operative complications

Post-operative complications	Number of cases	Percentage
Stitch abscess	10	2.5%
Minor haematoma	16	04%
Seroma	6	1.5%
Minor wound infection	6	1.5%
Wound infection requiring surgery	0	0%
Haematoma requiring surgery	0	0%
Bruising around incision	4	01%
Post-operative discomfort and mild pain (less than 3 months)	8	2%
Neuralgia (due to nerve damage or irritation)(more than 3 months)	3	0.7%
Removal of prosthesis due to infection or other causes	1	0.25%

(n=400)

Discussion

Seroma development following inguinal hernia repair is a known post-operative problem, most seromas will resolve spontaneously without requiring any intervention⁸. However, large seromas can be symptomatic, causing pain and discomfort to patient. Aspiration is one of the simplest ways to treat seromas. However, it can be uncomfortable and possesses a risk of bacterial contamination⁹.

A study of Lichtenstein's hernioplasty on 90 patients reported 11.1% incidence of seroma¹⁰ which means higher than the incidence in our NICH study. Friis and Lindahl observed seroma formation in four cases (3.9%) in a 102 case study of tension-free hernioplasty with prolene mesh¹¹. We have seen that the risk of seroma increases strongly in the case of strangulated and incarcerated hernia among hernia operations using

mesh..... strangulated or incarcerated hernia increased the risk for the development of the seroma.

A BMI over 30kg/m² increased the risk of developing seroma 4.3 fold in multiple binary logistic regressions. Ghnnam etal showed that seroma is related to BMI in their study¹². It is observed that obesity may increase incidence of seroma formation after open inguinal hernia repair.

In another study Sodergren and Swift found the seroma rate 4.5% for laparoscopic ventral hernia repair operations, and they especially emphasized that seroma dependent on dead space in the remnant hernia sac¹³.

We feel that type of anaesthesia has no role in seroma formation. Lichtenstein reported that they performed non-tension mesh repair under local anaesthesia¹⁴. However, it is stated that there is no significant difference between local, spinal and general anaesthesia in inguinal hernia repair¹⁵.

Park etal reported that if seroma in laparoscopic repair of incisional hernia is symptomatic and persists longer than 6 weeks, it should be viewed as a complication¹⁶.

In NICH 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 formation².

Some workers applied tetracycline solution over the mesh before closing the wound in order to reduce the incidence of seroma. Emin Turk, etal studied the effect of topical tetracycline on seroma formation after Lichtenstein repair in 96 patients and found no beneficial effect of using topical tetracycline on seroma development in grafted hernia repair¹⁷.

We feel that to reduce the incidence of seroma formation after inguinal hernia repair, we must do minimal tissue dissection, meticulous repair, minimum number of sutures, avoidance of dead space, maintenance of haemostable and preventive of haematoma formation and dressing of the operation site by an elastic dressing.

Theoretically the occurrence of seroma and haematoma may lead to an increase in the displacement of hernia patches, which increases the risk of post operative recurrence¹⁸. Data for several studies suggested that laparoscopic hernia repair was associated with higher rates of haematoma and seroma formation¹⁹.

As noted in a study conducted by Schmedt *et al*, hematoma and seroma may be present but unnoticed²⁰. In our study post-operative follow-up was done by either of the authors so chances of getting unnoticed seroma was zero as in other studies the post operative follow up and dressing were done by an OPD nurse.

Reference

1. Jones DB., Editor's comment, mastery of surgery, 5th edition, 2007; p.1965.
2. Nigam V K, Nigam S. Nigam's inverted curtain hernioplasty: a modified Lichtenstein tension free hernioplasty for inguinal hernia. ISJ.2019; vol 6(No 9):3241-3245.
3. Lau H Lee F. Seroma following endoscopic extraperitoneal inguinohermioplasty Surg. Endosc 2003; 17(1):1773-1777.
4. Bendavid R, Abrahamson J, Arregin ME, Aament JB, Phillips EH. Abdominal Wall Hernias. Principles and management. New York, NY, Springer publishing. 2001; 20(2):325-328.
5. Kapiris SA, Brough WA, Royston CM, S, O Boyle C, Sedman PC. Laparoscopic Transabdominal preperitoneal (TAPP) hernia repair: a 7-year two-center experience in 3017 patients. Surg Endosc 2001; 15(9):972-975.
6. Fitzgibbons RJ, Camps J, Cornet DA *et al*. Laparoscopic inguinal herniorrhaphy: results of a multicenter trial. Ann Surg. 1995; 221(1):3-13.
7. Leibl BJ, Schmedt CG, Kraft K, Ulrich MB, Bittner R. Scrotal hernias: a contraindication for an endoscopic procedure? Result of single institution experience in transabdominal preperitoneal repair. Surg. Endosc 2000; 14(3): 289-292.
8. Cihan A, Ozdemir H, Ucan BH, *et al* Fade or fate: Seroma in Laparoscopic inguinal hernia repair. Surg. Endosc 2006; 20(2): 325-8.
9. Tox FK, Bailey RW, Carey S, *et al*. Prospective multicenter study of laparoscopic ventral hernioplasty: Preliminary results. Surg Endosc 1998; 12(7):955-9.
10. Nateson AK, Basavanayak SN, Srikanth S. Study of the Lichtenstein's hernioplasty and it's post-operative complications for different types of inguinal hernia, ISJ 2019; Vol 6, No.7.
11. Friis E, Lindahl F. The tension-free hernioplasty in a randomized trial. Am J Surg 1996; 172:315-9.
12. Wagih Ghnnam, Ashraf Elrahawy, Magady EL, Moghazy. The effect of body mass index on outcome of abdominoplasty operations. www.wjps.iv/vol5/No.3/September 2016.
13. Sodergren MH, Swift I. Seroma formation and method of mesh fixation in laparoscopic ventral hernia repair of – highlights of a case series. Scandinaisan J Surg 2010; 99:24-7.
14. Lichtenstein IL, Shufman AG, Amid PK, *et al*. The tension-free hernioplasty. Am J Surg 1989, 157:188-92.
15. Young DV. Comparison of local and general anaesthesia for inguinal hernioplasty. Am J Surg 1987; 153:560-5.
16. Park A, Birch DW, Lovrics P. Laparoscopic and open incisional hernia repair: A comparison Study Surgery 1998; 124(4): 816-21.
17. Turk E, Karagulle E, Coban G, Yild E, and Moray G. Effect of Topical Tetracycline on Seroma Formation in the Lichenstein Technique: A Prospective Randomized study. Int Surg. 2014; 99(2):147-152.
18. Siddaiah, Subramanya M, Ashrafi D, Memon B, *et al*. Causes of recurrence in laparoscopic inguinal hernia repair. Hernia 2018;22:975-86.
19. Grant AM. Laparoscopic versus open groin hernia repair: met analysis of randomized trials based on individual patient data. Hernia 2002;6:2-10
20. Schmedt CG, Sauerland S, Bettner R. Comparison of endoscopic procedure vs. Lichtenstein on other open mesh techniques for inguinal hernia repair: a meta – analysis of randomized controlled trials. Surg Endosc 2005;19:188-99.