

## Modified Nigam's Inverted Curtain Hernioplasty (MNICH) is a better procedure than Lichtenstein's Tension-free Hernioplasty Procedure for inguinal hernia

V K Nigam<sup>1</sup>, Siddharth Nigam<sup>2</sup>

<sup>1</sup> Associate Director, Department of General and Minimal Invasive Surgery, Max Hospital Gurugram, Haryana, India

<sup>2</sup> Senior Surgeon, Department of General and Minimal Invasive Surgery, Max Hospital Gurugram, Haryana, India

### Abstract

Inguinal hernia is a common surgical problem. Post operative complications and specifically recurrence is the most important factor in deciding the efficacy of a hernia repair technique. Modified NICH, surpasses Lichtenstein hernioplasty in the rate of recurrence and incidence rate of post-operative complications as it scores less in these factors. Though, this is a small study but proves its advantages over original Lichtenstein technique.

**Keywords:** Inguinal hernia, lichtenstein hernioplasty, modified nich, postoperative complications, recurrence

### Introduction

Abdominal wall hernias are common surgical problems. Inguinal hernia is common in adult life but no age is excluded. Inguinal hernia is the most common of all hernias. Groin hernias constitute 75% of all abdominal wall hernias. Groin lumps are swellings which account for about 10% of general surgical out patient referrals [1]. According to some authorities; 73% are inguinal hernias, 17% are femoral hernias, 85% are umbilical hernias (congenital, infant, adult and paraumbilical hernias) and 1.5% are rare hernias. Incisional hernias are excluded.

Hernia was mentioned in the Egyptian papyrus of Ebers in 1552 BC. Hippocrates (460-373 BC) described umbilical hernia. Hindus were known to use an abdominal or a preperitoneal approach for cases of strangulated hernia, [2, 3] The elective hernia repair surgery is the most commonly performed surgery in India. Hernia affects 15%-20% of the general population in India. The prevalence of inguinal hernia in India is estimated to be 1.5 to 2 million [4]. Inguinal hernia is most common in men than women. About 90% of inguinal hernia repairs are done in men, whereas 70% of femoral hernia repairs are performed in women. The estimated lifetime risk of inguinal hernia in men is 27% and 3% in women [5, 6]. Approximately 20 million hernia operations are performed every year worldwide. It is estimated that 5% population will develop abdominal wall hernia in their lifetime. Approximately 7,50,000 inguinal herniorrhaphies are performed every year in United States [7].

Nigam's Inverted Hernioplasty (NICH) is an open tension-free hernioplasty based on Lichtenstein's tension-free hernioplasty, generally done for primary inguinal hernia. NICH tackles the both known aetiological factors for recurrence i.e. weakness inguinal floor and tension at the suture line. It involves minimum tissue dissection with least number of sutures. A 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 person. Semidouble breasting of the external oblique aponeurosis avoids displacement of mesh. NICH is associated with least recurrence, less post-operative complications and short learning curve.

Modified Nigam's inverted curtain Hernioplasty (MNICH) is a tension free hernioplasty for inguinal hernia. This procedure is based on the principles of Lichtenstein's tension-free hernioplasty. This technique is the combination of two hernia operation techniques NICH (Nigam's inverted curtain hernioplasty) and Bassini's repair. Bassini's repair is in partial form only. This technique of hernioplasty for inguinal hernias is simple and has almost no recurrence.

Lichtenstein tension-free hernioplasty, an open surgical repair technique for inguinal hernia was developed by Dr. Irving Lichtenstein in 1980s and is now considered as a gold standard for open hernia repair for inguinal hernia as it reduces recurrence rate and post-operative pain [8]. In this procedure a polypropylene mesh is placed covering the hernia defect without any tension of pull and stretch. The mesh is fixed by sutures to pubic tubercle, inguinal ligament and internal oblique aponeurosis. The main advantages of Lichtenstein hernioplasty are low recurrence and less post-operative pain. Generally, the potential complications are seroma, hematoma and chronic groin pain. The recurrence rate for Lichtenstein repair is often cited as being between 1% and 2% in specialized centers. Chronic pain after Lichtenstein operation is the common complication and is probably due nerve damage, nerve stimulation by mesh or mesh shrinkage.

Modified NICH has advantages over original Lichtenstein hernioplasty as it has no recurrence and low incidences of other complications such as chronic groin pain. Modified NICH is a method of inguinal hernia repair where NICH is done along with Bassini's repair. Before mesh placement in NICH the inguinal ligament and conjoint tendon are approximated with two sutures of 1/0 prolene suture instead of complete Bassini repair. The modified NICH is the combination of modified Bassini repair and modified NICH. This procedure, of combination of two processes, aim's to get benefits of both procedures.

### Material and Methods

This study was conducted at Max Hospital, Gurgaon, Haryana, India between April 2013 and March 2025. A total of 55 cases were operated by modified-NICH technique by same team of surgeons and at one centre. This study

included only uncomplicated cases of inguinal hernia. Both direct and indirect inguinal hernia cases were included. The exclusion criteria did not allow to include complicated cases of inguinal hernia such as irreducible, obstructed, incarcerated and strangulated inguinal hernia. Cases of groin hernia other than inguinal hernia were also not included. Informed consent was taken from all patients before operation. The operations were performed under local, spinal or general anaesthesia. Skin incision was made in inguinal region, same in both the direct and indirect inguinal hernia cases. The external oblique aponeurosis was incised in the same line, line of incision, upto superficial inguinal ring. External oblique aponeurosis and internal oblique aponeurosis and muscle were separated from each other and a space was made between these two by blunt dissection with index finger wrapped with a gauge piece. The space was made on medial, middle and lateral side. Utmost care was taken to avoid injury to ileoinguinal and ileohypogastric nerves. Hematoma formation was avoided by being gentle. The hernia sac was identified. Search for femoral hernia was also made. Indirect inguinal hernia sac was cut open and the contents were reduced and the sac was transfixed. Direct inguinal hernia sac was not opened only reduced and plicated.

The inguinal ligament and conjoint tendon (arching fibers of internal oblique muscle) were approximated by 2 prolene 1/0 sutures (partial Bassini’s repair). In both direct and indirect inguinal hernia the 7.5 x 15 cm polypropylene mesh was used covering the weak area. It was placed between external oblique aponeurosis and internal oblique aponeurosis and muscle. The mesh was fixed to the inguinal ligament by 2, 1/0 prolene sutures, one near pubic tubercle and the other approximately 4 cm away from it. The lateral margin of the mesh was cut at a point at 2 cm from the lower margin to make a slit about 4 cm long. The spermatic cord was taken out from the slit and this made an artificial deep inguinal ring of mesh. The two cruras of mesh made by slit sutured together and then down to the internal

oblique muscle fibers at lateral margin of deep inguinal ring. Thus a perfect artificial deep inguinal ring was made. This suture also served the purpose of narrowing of deep inguinal ring.

Then the mesh was cut and shaped according to the space available and size of myopectineal orifice of Fruchaud. The extra part of the mesh was excised. The mesh should extend atleast 3 cms beyond deep inguinal ring laterally and 5 cms above the lower edge of the arching fibers of internal oblique aponeurosis and muscle and 2 cms beyond pubic tubercle. The upper part of mesh was just pushed in the space created between external oblique aponeurosis and internal oblique muscle. No suture was applied over the main body of mesh so the mesh looked like an inverted curtain as it was fixed only to the rod or inguinal ligament only and rest of it remained free. That’s why the name of the procedure is Nigam’s Inverted Curtain Hernioplasty. The external oblique aponeurosis was closed with 2/0 polypropylene suture, continuous in a semi-double breasting manner. The margin of the upper flap was sutured over the outer surface of lower flap 1 cm below the margin. The free margin of the lower flap remained free under the upper flap. This double breasting can also be done in reverse manner, lower flap stitched over the upper flap in same manner. This semi double breasting of external oblique aponeurosis gives a slight pressure or support to the mesh influencing it to stick to underlying soft tissues quickly and not to get displaced. The wound was closed in conventional manner. Subcutaneous tissues were closed by 2/0 vicryl interrupted sutures. Skin was closed by staples. Betadine-soaked dressing was applied over the closed wound. Ambulation was not restricted. The patient was discharged next day. Oral antibiotics and pain killers were advised for 3 to 5 days post operatively. All patients were called for follow up on 8th post-operative day for removal of staples and review of the wound.

**Results**

**Table 1:** Distribution of cases according to demographics

Demographics	Number	Percentage (%)
1. Age		
20-29	4	7.2%
30-39	18	32.7%
40-49	28	50.9%
50-59	4	7.2%
60 and above	1	2%
2. Gender		
Male	52	94.5%
Female	3	5.5%
3. BMI		
18.5 to 25	24	43.5%
25.1 to 35	30	54.5%
Above 35	1	2%

n=55

In our study most of the patients were of age group 40 to 49 years but age of the patients varied from 21 years to 65 years. There were only 3(5.5%) patients females and rest

(94.5%) of the patients were male. Most of the patients had BMI between 25.1 to 30 (54.5%).

**Table 2:** Distribution of cases of various types of inguinal hernia and type of anesthesia given

Types of hernia & anesthesia	Number	Percentage
Indirect inguinal hernia	39	70.9%
Direct inguinal hernia	16	29.1%
Under local anesthesia	7	12.7%
Under spinal anesthesia	42	76.3%
Under general anesthesia	6	11%

n=55

Most cases (39, 70.9%) in our study belonged to indirect inguinal hernia group. Direct inguinal hernia cases were only 16 (29.1%). Most of cases (42, 76.3%) in this series were operated under spinal anesthesia any 6 cases (11%) were operated under local anesthesia.

**Table 3:** Distribution of cases according to post-operative complications

Complications	Number of patients	Percentage
Minor hematoma	2	3.6%
Seroma	2	3.6%
Wound infection	3	5.5%
Neuralgia	1	2%
Recurrence	0	0%
Removal of mesh due to complications (infection or neuralgia)	0	0%

n=55

The main advantage of Modified NICH is zero recurrence rate. No major complications were noticed. Removal of mesh due to chronic groin pain or infection did not happen.

### Discussion

The modified NICH (MNICH) is found superior to the original Lichtenstein hernioplasty as shown by the results but it requires further study with more cases as this series has limited number of cases. Patients operated by MNICH generally feel less postoperative pain & discomfort and also have faster recovery. Shorter hospital stay happens due to faster recovery. There is less occurrence of overall complications such as hematoma, seroma and wound infection due to minimal and gentle dissection. MNICH has easier and shorter learning curve.

Nyphus LM, who commented about surgical techniques for hernia repair that, "A single technique is not appropriate for all patients". It is said that Bassini did modernization of hernia surgery about 120 years back and since then only 20 years back we started modernization again [9]. Inguinal hernioplasty is the reconstruction or strengthening of the posterior wall of the inguinal canal by filling the defect or weak area with autogenous or heterogenous material. J. Stephenson Scott et al, wrote (Mastery of Surgery, 2007) that, tension-free repairs have become the "gold standard" in hernia surgery.

MNICH is a tension free operation, combining NICH, with Bassini's repair (Bassini's repair is done here partially). In Bassini's repair the inguinal ligament and conjoint tendon are approximated with multiple interrupted sutures but in Modified NICH, we apply only 1 or 2 interrupted sutures loosely depending upon the size of defect. This doesn't put tension. Edoardo Bassini, an Italian Surgeon, known as "the father of modern hernioplasty", developed his procedure of hernia repair in 1885. He did a follow-up of 5 years in all patients, 1885 to 1890 [10]. He reported the recurrence rate of 2.7% at one year [11].

When the person who is operated by Modified NICH technique stands, walks or runs in day to day life the changing posture or bulge/prominence of abdominal wall will not cause any strain over the mesh as there is no fixation of the main body of the mesh and it is free to take any shape. It avoids maldistribution of tension on the mesh. This factor of Modified NICH reduces post operative pain and discomfort. It also avoids dead space formation as the

mesh curves as per abdominal wall curvature, it avoids collection of blood and haematoma formation as there is no dead space. It also prevents infection of mesh by haematoma getting infected. It is absolutely tension free procedure.

NICH enjoys the advantages of both the suture and suture less mesh hernioplasty. Less number of sutures policy gives 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 [12, 13].

Moreover, semi double breasting of the external oblique aponeurosis helps the outcome. 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.

### Conclusion

Modified NICH is a combination of Bassini and NICH procedures and so ensures the benefits of these two procedures also. Modified NICH is a better procedure than Lichtenstein hernioplasty for inguinal hernia treatment. It is an easy, simple, recurrence free technique with short learning curve along with low incidence of post-operative complications and therefore, is better than Lichtenstein hernioplasty.

### Acknowledgements

The authors would like to thank Dr. Charvi Chawla and Mr. Vipin Sharma for their valuable support during this work.

**Financial support and sponsorship:** No funding sources

**Conflict of interest:** Nil

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