

Original Research Article

All in one meshplasty verses conventional open meshplasty in inguinal hernia in a tertiary care setup

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ABSTRACT

Background: Inguinal hernia surgery has continued to evolve historically from tissue repair to the present tension free repair by using mesh. Various tension free mesh repair have been demonstrated throughout the years after lichten stiens tension free meshplasty but inguinodynia continues to be a problem with all hernioplasties. All-in-one mesh hernioplasty showed zero incidence of inguinodynia in 50 patients who underwent this novel procedure. The primary aim of the study was to compare between all in one meshplasty vs conventional open meshplasty in inguinal hernia in tertiary care setup.

Methods: Our study was done in SRM Medical college and research center attached to SRM University in Kattankulathur, Chennai for one and half year. It was comparative study between all in one meshplasty verses conventional meshplasty. A sample size of 100 patients was the part of this study, out of which 50 underwent mesh fixation by all in one meshplasty and 50 patients underwent mesh fixation by conventional meshplasty.

Results: All-in-one meshplasty can be considered superior to conventional meshplasty in view of incidence of post-op neuralgia, operative time, duration of stay in hospital.

Conclusions: All-in-one meshplasty can be considered as a good replacement for conventional hernioplasty in inguinal hernia repair expecting lesser post-operative morbidity and a better quality of life post-operatively.

Keywords: Hernioplasty, Inguinodynia, Lichtenstein's tension free meshplasty, Neuralgia

INTRODUCTION

Abnormal protrusion of part or whole of viscus through the wall that contains it.

"A protrusion of any viscus from its proper cavity is denominated a hernia. The parts are generally contained in a bag by a membrane with which the cavity is naturally invested"- Sir Astley Cooper (1804). Inguinal hernias are considered one of the most common problems encountered by the general surgeons all over world. Total 15%-16% of surgical procedures are done are groin hernia repairs. Groin hernias account to nearly 75% of all abdominal wall hernias. Present hernia repair techniques involve mesh fixation through anterior approach like Lichtenstein

tension free repair, gilberts technique for hernia repair which was sutureless and mesh Rutkow's hernioplasty which used mesh plug, these techniques necessary involve dissection of cord structures with attendant complications like nerve entrapment, testicular atrophy, ischemic orchitis and chronic inguinal pain.

Various mesh repairs have been demonstrated throughout the years after Lichtenstiens tension free meshplasty but inguinodynia continues to be a problem with all hernioplasties. All-in-one meshplasty first published by Dr. Angelo Guttadauro in a published article "All-in-one mesh" hernioplasty: A new procedure for primary inguinal open repairs". The study showed zero incidence of inguinodynia in 250 patients who underwent this novel procedure.¹⁷

The aim of the study was to compare between all in one meshplasty vs conventional open meshplasty in primary inguinal hernia in a tertiary care setup and main objective of this study was to estimate the difference between complications of conventional meshplasty vs all in one meshplasty particularly in view of neuralgia, to study the difference in operative time and hospital stay in both procedures.¹

METHODS

This study was undertaken in the, general surgery department, SRM Medical College Hospital and Research Centre, Chennai during the period of May 2018 to October 2019.

Study design

The study design was prospective interventional study.

Study source

The study was undertaken in SRM MCH and RC Kattankullathur.

Study population

All Patients admitted with clinical diagnosis primary inguinal hernia under general surgery care at SRM Hospital.

Sample size

The sample size was 100.

$$N = 4pq / (l^2)$$

Where, p= 75% (prevalence); q= 100-p that was, 25%; l= allowed error= 75/100*10; N= 133.33~100

Statistical analysis

Statistical analysis was done using SPSS software- version 20. The mean, standard deviation, p value, t test were performed. The acquired data was statistically analysed using appropriate methods. Observations from pro forma was entered into the computer and data analysis will be done by using Statistical package for social sciences version 24 software. Categorical variables were expressed as mean and standard deviation. Student t test was used for 2 group studies. To compare, Mann whitey test was used as well. A value of p<0.05 was considered to be statistically significant.

Inclusion criteria

All patients diagnosed as primary inguinal hernia clinically on admission and eligible for meshplasty were included.

Exclusion criteria

All patients with congenital inguinal hernia; with recurrent/sliding inguinal hernia; strangulated/ obstructed inguinal hernia; and with COPD/BPH/other associated illness leading to intra-abdominal pressure rise.

All in one meshplasty

This technique first described by Dr. Angelo Guttadauro, Dr. Maternini from Italy.

In this technique specific shape of prolene mesh is employed which has 3 parts: (a) part A- ring shaped portion designed to strengthen the deep inguinal ring by surrounding it; (b) part B- thin connection of prosthesis between A and C; and (c) part C- trapezoid shaped part of mesh to be laid on floor of inguinal canal. In this technique prolene mesh is placed in such a way that it is sandwiched between fascia transversalis and fibro-cremasteric mesh avoiding the direct contact of mesh with the inguinal nerves which further reduces chances of inguinodynia. It is a novel procedure and not many studies are done over all in one meshplasty.

RESULTS

Two groups were required for the study, one for the conventional meshplasty and the other for the all in one meshplasty. Simple randomization was done which was obtained by selecting every alternate patient for conventional meshplasty and all in one meshplasty. The patients to be included in the study were done after explaining the study to them in detail in their local language; consenting patients who meet the inclusion criteria were included. The study was commenced after obtaining approval from the Ethical committee. A total of 100 patients consented and fulfilled all the criteria and formed a part of the study, of which 50 underwent all in one meshplasty and 50 underwent conventional hernioplasty. Comparisons was made between all in one mesh repair and conventional mesh repair under criteria of Intra op time, post-op pain-based on visual analogue scale, complication (other than neuralgia), hospital stay.

Age

Mean age for all in one meshplasty group was 51.36 whereas for conventional meshplasty was 45.98; with a standard deviation of 16.34 in all in one meshplasty and 14.83 in conventional meshplasty. Majority of the patients (28 in the all in one meshplasty group and 29 in the conventional meshplasty group) were from the age group between 31-60 years indicating that the patients in this study were mostly middle aged.

Operative time

The average operative time taken by the 2 methods, that is by all in one meshplasty and conventional meshplasty are

55, 30 and 61. 70 minutes respective. Standard deviation for all in one meshplasty and conventional meshplasty were about 4.67 and 4.80 respectively with mean \pm SD begin 55.30 \pm 4.67 and 61.70 \pm 4.80 respectively. An average difference of 6.4 minutes was seen between the 2 methods with the conventional meshplasty procedure taking a comparatively longer time to complete in comparison to all in one meshplasty. This difference was statistically significant ($p=0.00$).

Hospital stay

Hospital stay, was measured in days, it was found that patients average hospital stay in all in one meshplasty group was 3.14 where as in conventional meshplasty was 4.46 days. As shown in Table 3. The SD of all in one meshplasty and conventional meshplasty groups are 0.49 and 0.99 days. Conventional meshplasty required longer hospital stay with an average difference of 1.32 days in comparison to all in one meshplasty. This difference was statistically significant ($p=0.00$).

Reduction in pain

The pain at 12 hours was taken as the baseline score with which a comparison was made of the subsequent pain scores at 24 hours, 48 hours, 72 hours, 1 week, 1 month, 3 months and 6 months. The mean VAS pain score was found to be 5.04 (SD-0.90) and 6.69 (SD-0.81) in all in one meshplasty group and conventional meshplasty group respectively at first 12 hour. That the difference in the pain in the two groups in the immediate postoperative period is significant ($p<0.05$). It was seen that the mean VAS score has come down to 3.5 and 5.64 at 24 hours in all in one meshplasty and conventional meshplasty groups respectively with a SD Of 0.67 and 0.63. This difference in pain experienced at 24 hours was significant ($p<0.05$).

The score at 48 hours in all in one meshplasty and conventional meshplasty groups are 1.86 and 4.28 respectively with SD of 0.72 and 0.45. The p value was 0.00 (<0.05), which shows that there is a significant difference in the pain experienced at 48 hours by the in all in one meshplasty and conventional meshplasty groups with pain being higher in conventional meshplasty group. It was seen in that the mean VAS score was 0.84 (SD-0.51) and 3.16 (SD-0.54) in all in one meshplasty and conventional meshplasty at 72 hours post-surgical procedure respectively. A reduction in the pain score can be appreciated in comparison to the previous tables. The difference in pain at 72 hours in both the groups can be said to be significant as the p value is 0.00 (<0.05). All the patients were discharged after 72 hours with instructions to attend the surgical OPD at particular days for follow up. The pain experienced at 1-week post-surgery according to VAS score in terms of mean, SD, t value and p value. The mean pain score was found to be 0.3 in all in one meshplasty group and 1.7 in conventional meshplasty group. There is a significant difference in the pain in both the groups and the p value was found to be less than 0.05.

The mean VAS score at 1 month was 0.08 which was almost close to no pain in all in one meshplasty group and is 1.22 in conventional meshplasty group with a SD of 0.27 and 0.79 respectively. The difference in pain was significant as the p value was <0.05 . In this study, at 3 months, the mean VAS score and SD are 0 and 0.94 respectively in all in one meshplasty and conventional meshplasty with SD of 0 and 0.68 respectively with a p value of less than 0.05. This shows that there was significant pain in conventional meshplasty group after 3 months.

The mean pain score was nil with 0 in the all in one meshplasty and a persisting score of 0.7 in conventional meshplasty. The SD was 0 and 0.70 in all in one meshplasty and conventional meshplasty respectively. Difference of pain after 6 months was found to be significant as the p value was <0.05 in between two groups. Seroma collection was noted in 2 conventional meshplasty cases which was managed conservatively with antibiotics and was resolved by 3 days were discharged on 3rd post-op day. No other complications noted. No recurrence noted in 6 month follow up period.

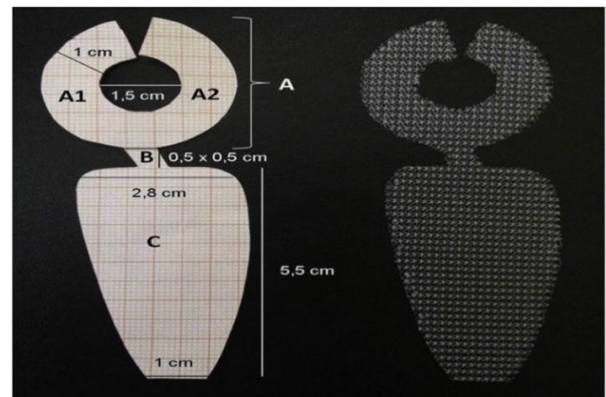


Figure 1: Prolene all-in-one mesh.

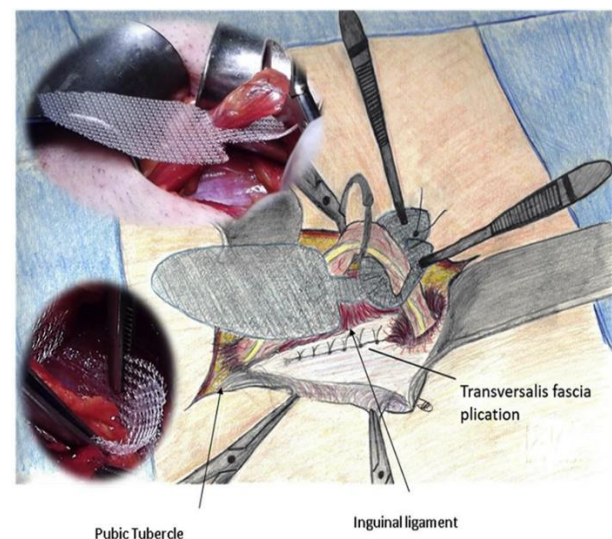


Figure 2: Placement of part a in the deep inguinal ring.

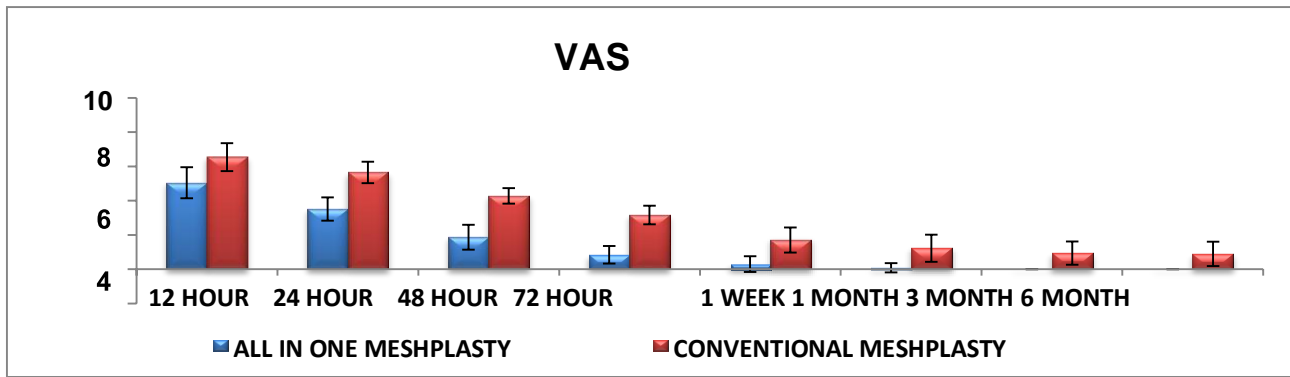


Figure 3: Summary statistics- cumulative pain graph 12 hr, 24 hr, 48 hr, 72 hr, 1 week, 1 month, 3 months and 6 months.

Table 1: VAS comparison.

Visual analog score/duration	Angelo et al- 'All in one'	Present study- 'All in one'	Present study- Conventional
Within 12 hours	2.1	5.04±0.9	6.54±0.8
1 st week	1.2	0.3±0.4	1.7±0.7
6 months	Nil	Nil	0.9±0.7

DISCUSSION

Age

Age selection for whole study was mostly for 30-70 years with average age in all in one meshplasty was 51 years, and for conventional meshplasty was 45 years. Whereas in Angelo et al it was of average 61.7 years.

Operative time

Operative time was a subjective measure and depends upon skills of surgeon and his expertise in doing particular type of technique. Operative time noted in all in one meshplasty was 55.3 min on average whereas on conventional meshplasty it was 61.7 min which was significant. Where as in Angelo et al all in one meshplasty average operative time was 25 mins.¹

Hospital stay

Hospital stay was noted to be significantly less in case of all in one meshplasty which was 3.14 days in comparison to conventional meshplasty which was 4.46 days, which shows significant reduction of inpatient stay post all-in-one meshplasty. In Angelo et al study discharge of patients were done within 24 hour in all 250 patients, which can be considered to be effected due better availability of health care at the place of study.¹

Pain

Pain was measured in both Angelo et al study and present study by using visual analog score. While comparing with both studies all in one meshplasty showed nil incidence of

chronic groin pain, whereas 36 patients in conventional meshplasty had 1-2 VAS score at 6 months as shown in Table 18. None of the patient with all in one meshplasty suffered from post op neuralgia, foreign body sensation or even slight discomfort.

Complications post-op (other than neuralgia)

Complication noted in the form of wound infection in 2 patients of conventional hernioplasty which was treated conservatively. No complications was noted in all in one meshplasty over the period of 6 months. It was statistically significant but to reach a definitive conclusion more number of samples was needed. No recurrence was seen in both conventional as well as all in one meshplasty. In Angelo et al out of 250 patients 2 developed orchitis and 1 recurrence was seen over 2 years.

Lichtenstein's technique is a common technique which provides prosthesis to remain on fascia transversalis by fixing it to sides which in turn necessarily remains under aponeurotic in the upper third. In all in one meshplasty technique prosthesis remains on fascia transversalis by coating it with fibro-cremasteric sheath and it remains fixed on the inguinal floor with a single fixing suture at the pubic level and with the prosthetic conical ring on the deep inguinal ring. It doesn't have any contact with aponeurotic sheath at any point. In addition to this there is no contact of ilioinguinal and ilio-hypogastric nerves with the prosthesis.

Limitations

The limitation of the study was- (a) it was a single blinded study; (b) the sample size of this study was 100 which can

be considered small, a higher sample size can have different result; (c) duration of study was limited due to which recurrence rates could not be compared; and (d) pain has a variable threshold person to person, and hence a subjective symptom

In spite of these limitations, the strength of this study was its homogeneity as it was a single surgeon study.

CONCLUSION

From this study, we conclude that all in one meshplasty is superior to conventional meshplasty (Lichtenstein's hernioplasty) in several aspects. All in one meshplasty has a relatively less operative time which is useful in high volume centres. The immediate postoperative and chronic postoperative pain are also low to nil in all in one meshplasty with no added intra-operative or post-operative complications seen with all in one meshplasty. All in one meshplasty is simple to perform surgery with a significantly low chance of inguinodynia. Hence all-in-one meshplasty can be considered as a good replacement for conventional hernioplasty in inguinal hernia repair expecting lesser postoperative morbid and a better quality of life post-operatively.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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