Usefulness of Interrupted Absorbable Subcuticular Sutures in Elective General Surgical Procedures- A Randomized Case Control Study

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ABSTRACT

BACKGROUND
In head and neck surgeries, and day care surgeries, surgical wounds are usually closed either by interrupted non absorbable sutures or by continuous subcuticular sutures either absorbable or nonabsorbable. Studies show definite advantage of continuous absorbable subcuticular sutures over usually used interrupted nonabsorbable sutures. In this context, we thought of interrupted subcuticular sutures where we can tackle the above-mentioned limitations, while actually reducing the financial burden of the patients.

METHODS
In this randomised case-controlled study, we have included all elective general surgical procedures including day care surgeries that is being carried out in the department of General Surgery Govt. Medical College, Kottayam for a period of 2 years starting from 2016. Total number of cases taken are 100; 50 each in each group which is again divided into 5 subgroups, each containing 10 patients. For the conventional methods we used continuous subcuticular sutures, interrupted sutures with polyamide, or skin staplers. We compared the advantages and disadvantages of patients receiving the conventional methods of skin suturing and those receiving the interrupted absorbable subcuticular sutures. The differences are being assessed by comparing 8 factors viz. surgical site infection, haematoma, wound gaping, allergy to suture material, hypertrophic scar formation, chronic pain, and patient satisfaction (cosmesis and flexibility in follow up hospital visits). Each factor is given one point (first 7 points for NOs and the last one point for YES) and the patients are grouped into three subgroups with those securing 0-3 points, 4-6 points and 7-8 points. Patients belonging to the third group are considered to have the most benefit and the first group the worst.

RESULTS
Most of the scores in interrupted method are 7 (around 66%), while in conventional method it is somewhat equally distributed with highest frequency for score 7 only in 28%. Mean and median scores for conventional method are 5.10 and 5.00 respectively and that of interrupted method is 6.46 and 7 respectively. The output of Mann Whitney Test is observed as: The mean rank for conventional method is 38.17 and that of interrupted method is 62.83. Mann Whitney U statistic is 229.00 and p-value for significance is approximately equal to Zero.

CONCLUSIONS
We recommend interrupted absorbable subcuticular suturing technique in routine general surgical procedures, especially where we use curvilinear incisions, saving the time of the surgeon and the patient. For the national healthcare system, this can lead to considerable cost savings without compromising clinical effectiveness or safety.

KEYWORDS
Absorbable Suture, Curvilinear Incision, Nonabsorbable Suture
BACKGROUND

In head and neck surgeries and day care surgeries surgical wounds are usually closed either by interrupted non absorbable sutures or by continuous subcuticular sutures either absorbable or nonabsorbable. Studies show definite advantage of continuous absorbable subcuticular sutures over usually used interrupted nonabsorbable sutures. But it has some limitations; for example, in case if there is any underlying haematoma formation, we may have to cut open the entire surgical wound since it is a continuous suture and it may not be as effective as interrupted sutures in case of curvilinear incisions. So interrupted non absorbable sutures are having advantage over continuous absorbable sutures in these circumstances. But the tissue reaction is more, and the patient needs another visit to the surgeon for the purpose of suture removal. In this contest we thought of interrupted subcuticular sutures where we can tackle the above-mentioned limitations; while actually reducing the financial burden of the patients (same suture material can be used for subcutaneous and subcuticular suturing).

We wanted to assess the usefulness of interrupted absorbable subcuticular sutures over conventional wound closure techniques.

METHODS

In this randomised controlled study, we have included all elective general surgical procedures including day care surgeries that is being carried out in the department of General Surgery Govt. Medical College, Kottayam for a period of 2 years starting from 2016. Total number of cases taken are 100; 50 each in each group which is again divided into 5 subgroups, each containing 10 patients. These groups are surgeries for central neck swellings, surgeries for benign breast diseases, lymph node biopsies, surgeries for extremity swellings, groin surgeries (hernias, varicose veins). We used 3-0 polyglactin for the wound closure in interrupted skin closure technique. Technically it is interrupted inverting subcuticular suture. We compared the advantages and disadvantages of patients receiving the conventional methods of skin suturing and those receiving the interrupted absorbable subcuticular sutures. The differences are being assessed by comparing 8 factors viz. surgical site infection, haematoma, wound gaping, allergy to suture material, hypertrophic scar formation, chronic pain, and patient satisfaction (cosmesis and flexibility in follow up hospital visits). Each factor is given one point (first 7 points for NOs and the last one point for YES) and the patients are grouped into three subgroups with those securing 0-3 points, 4-6 points and 7-8 points. The patients belong to the third group are considered to have the most benefit and the first group the worst.

Inclusion Criteria

All the elective clean general surgical cases including head and neck surgeries, laparoscopic and open hernia surgeries, varicose vein surgeries and all day-care surgeries were included in the study after getting informed consent in every case.

Exclusion Criteria

All the oncological procedures apart from diagnostic procedures were excluded from the study. All the data were analysed using the SPSS software.

RESULTS

The scores of hospital visit were decreased as it is 1 for interrupted sutures and zero for conventional methods in all observations. So, the maximum score will be 7 in both groups. We can see that most of the scores in interrupted method are 7 (around 66%), while in conventional method it is somewhat equally distributed with highest frequency for score 7 only in 28% (Graph 1).

Graph 1. Frequency Plot

Table 1. Descriptive Statistics

Graph 1 showing frequency plots interrupted absorbable subcuticular method and conventional groups Mean and median scores for conventional method are 5.10 and 5.00 respectively and that of interrupted method is 6.46 and 7 respectively. Primarily from descriptive statistics measures both the methods look dissimilar, with interrupted method giving higher scores. We need to see if the difference is statistically significant. From the skewness and kurtosis measures one can say that the data is not normally distributed and also the dependent variable (score) is ordinal
Impaired wound healing increases costs of health care and leads to poor cosmetic results. The optimal method of closure of skin still remains unclear. Studies show advantages of continuous absorbable sutures over interrupted nonabsorbable sutures (simple/mattress). Use of absorbable sutures lead to a reduced risk of wound dehiscence. In a Study conducted by Tanaka A et al in 2014 concluded that subcuticular suture did not increase the incidence of wound complications in elective colon cancer operation and the patients preferred a technique of interrupted subcuticular closure, citing better cosmetic results, and less pain. Differences in the methods of skin closure have the potential to affect patient outcomes and use of healthcare resources.

A meta-analysis performed in randomized controlled trials (RCTs) where a total of 1748 patients in 19 RCTs were analysed, that compared outcomes of absorbable versus nonabsorbable sutures for skin closure found no significant difference between absorbable sutures and nonabsorbable sutures in the incidence of wound infections, cosmetic outcomes, scar formation, wound dehiscence, and patient’s or patient caregiver’s satisfaction. They also noted that better cosmetic results were achieved by using intradermal absorbable sutures compared with nonabsorbable sutures in subgroup analysis, but this result might be affected by insufficient follow-ups. They also concluded that absorbable sutures for skin closure were not inferior to nonabsorbable sutures and it should be recommended due to its great cost and time savings.1

Cley F et al noticed in their meta-analysis of trials comparing staples and subcuticular sutures for skin closure at caesarean section (CS) pooled outcome measures were calculated using random effects models. Outcomes analysed were rates of wound dehiscence (separation) and a composite wound complication rate, patient satisfaction, operating time, and postoperative pain. Their findings suggest a possible benefit with subcuticular sutures compared to skin staples for skin closure at CS, though the optimal skin closure technique at CS demands further study.2 Another study done on patient satisfaction found that nonabsorbable sutures (NAS) require a suture removal visit, which might inconvenience the patient due to lengthy distance of travel, advanced age, co-morbid conditions, limited mobility, or work and family obligations, whereas absorbable sutures (AS) permit scheduling flexibility for the return visit, and postoperative visits after the immediate healing stage, allows the surgeon to better assess repair outcomes, considering it might take weeks for inflammation to resolve and months for scars to mature. Thus, on the basis of high patient-reported satisfaction, absorbable sutures can be recommended as an excellent option for linear repairs.3

Sajid MS et al in their meta-analysis of 10 RCTs demonstrates that the complication rates after the use of AS is similar to NAS for skin closure, for surgical site infection and other operative morbidities. The study also noted that AS do not increase the risk of skin wound dehiscence, rather lead to a reduced risk of wound dehiscence compared to NAS.4

Parel GJ et al found that in adults with clean wounds of the face or neck, there is no difference in long-term cosmetic results of repairs with permanent or absorbable suture material. They preferred absorbable sutures, as they do not have to be removed, saving the surgeon time and lessening patient anxiety and discomfort.5 Studies done to compare the 9- to 12-month cosmetic outcome of facial lacerations closed with rapid-absorbing gut suture (RG), octyl cyanoacrylate (OC), or nylon suture (NL) hypothesized that no important differences exist between these methods. They did not detect clinically important differences in cosmetic outcome at 9 to 12 months in patients with facial lacerations closed with RG, OC, or NL, although RG or OC could be preferred to eliminate follow-up visits for suture removal.6,7 Tan PC et al hypothesized that an absorbable suture that does not require removal will be associated with greater patient satisfaction.8

Comparison studies of cosmetic outcomes of absorbable versus nonabsorbable Sutures in Paediatric Facial Lacerations caregiver visual analogue scale scores showed noninferiority of absorbable sutures, which were also preferred by the caregivers.9 conventional methods of wound closure involve absorbable sutures for

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**DISCUSSION**

**Table 2. Mann Whitney U Test**

<table>
<thead>
<tr>
<th>Rank</th>
<th>score</th>
<th>Conventional</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
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<tr>
<td>1</td>
<td>100</td>
<td></td>
<td>50</td>
<td>38.17</td>
<td>1908.50</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>Interrupted</td>
<td>50</td>
<td>62.63</td>
<td>3141.50</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
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</table>

**Test Statistics**

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<th>Test Statistic</th>
<th>Method</th>
<th>Value</th>
</tr>
</thead>
<tbody>
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<td>Mann-Whitney U</td>
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<td></td>
</tr>
<tr>
<td>Wilcoxon W</td>
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<td></td>
</tr>
<tr>
<td>Z</td>
<td>-2.737</td>
<td></td>
</tr>
<tr>
<td>Asympt. Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

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**Table 1** showing descriptive statistics, with interrupted method giving higher scores. The output of Mann Whitney Test is observed as: The mean rank for conventional method is 38.17 and that of interrupted method is 62.83. Mann Whitney U statistic is 225.00 and p-value for significance is approximately equal to Zero. Since p-value is less than 0.05 we reject null hypothesis. Therefore, have statistically significant evidence at a =0.05, to show that the two populations of scores are not equal. From descriptive statistics, we can see that interrupted method gives a higher score compared to conventional method. Table 2- The mean rank for conventional method 38.17 and that of interrupted method 62.83.

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We recommend interrupted absorbable subcuticular suturing technique in routine general surgical procedures, especially where we use curvilinear incisions, saving time of the surgeon and the patient. For the national healthcare system, this can lead to considerable cost savings without compromising clinical effectiveness or safety. Above all it is more gratifying for the patient in terms of cosmesis and flexibility in follow up visits.

REFERENCES


CONCLUSIONS

initial subcuticular strengthening and nonabsorbable sutures for final wound edge approximation. Traditionally, absorbable sutures have not been used as the primary method of skin closure because of concerns regarding increased risk of wound infection and poor cosmetic outcome. However, within the past few years there have been several data demonstrating positive results with absorbable suture such as plain catgut, poliglecaprone, and polyglactin in full-thickness skin closures. Increasing the use of topical skin adhesives and short-term absorbable sutures in routine surgery could lead to considerable cost savings without compromising clinical effectiveness or safety. In comparison to the worldwide studies conducted on wound closure techniques we also got statistically significant evidence for the advantages of the interrupted absorbable skin sutures. Patients and caregivers were happy that their follow up visits were flexible, thus avoiding the anxiety and discomfort for the patient. From the surgeon’s point of view this saves time and the follow up can be planned after the initial healing phase without hampering the clinical effectiveness or safety. More than that, for the government, there can be considerable cost savings if we regularly use this method for routine surgeries.

Interestingly there were no studies found in relation to breast surgeries where we use curvilinear incisions (circum-areolar) for benign breast diseases. This procedure is more suited for curvilinear incisions, especially in breast surgeries where there is a chance for haematoma formation. Here we can take out one of the suture and evacuate the haematoma instead of taking out all the sutures in continuous subcuticular sutures, thus minimising scar formation and avoiding secondary suturing. Apart from that avoidance of one hospital visit (for suture removal) in such cases can be gratifying to the patient. So, once you are trained in this procedure it is highly beneficial to the patient, surgeon and more importantly to the government health care system.