

COMPARATIVE STUDY OF LAYERED AND SINGLE LAYER CLOSURE OF ANTERIOR ABDOMINAL WALL FOLLOWING OBSTETRICAL & GYNAECOLOGICAL LAPAROTOMIES

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SUMMARY

The matter of attempting to revive single layer closure of anterior abdominal wall incisions as a viable option is generally considered with caution. In hundred laparotomies done for various Obstetrical and Gynaecological conditions, half the cases were randomly chosen for single layer closure and others for conventional layered closure. The data obtained shows a distinct advantage of single layer closure as there was substantially low incidence of haematoma formation, wound dehiscence and incisional hernia. In the authors opinion this technique requires reconsideration in the modern era.

Introduction

Clean and sound healing of abdominal wall incision after intra abdominal procedure is cardinal index of good surgical care (Dennis, 1973). Moynihan, 1926 advocated that the steps in the making and repair of an abdominal wound were of the greatest importance in sound wound healing. It has been observed that the abdominal incisions, regardless of skill with which they are closed, weaken the integrity of the abdominal wall. It is necessary for us to determine the means of obtaining maximum strength after abdominal wall closure. Pollock, 1982 summarised the technical factors promoting good wound healing as minimal bacterial contamination, good haemostasis, approximation without undue tension, minimal residual foreign material, minimum of devita-

lised tissue and obliteration of dead space. In wound closure, our aim is to exclude the possibility of postoperative wound dehiscence and wound sepsis earlier and incisional hernia developing at a later date. Layered closure with restitution of anatomy of various abdominal layers is frequently employed by the surgeons. Compared to it a single layer suturing of the abdominal wall is very uncommon and it has gained recognition recently. The present study has been undertaken with a view to evaluate the significance of the two closure techniques of laparotomy wounds.

Material and Methods

One hundred cases undergoing laparotomy in the Department of Obstetrics and Gynaecology in Medical College, Jammu, were randomly assigned to two groups, Group I, or the study group consisted of 50 cases, Group II, or the control group also

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had 50 cases. Patients were assigned the group irrespective of age, built, disease process or the type and extent to surgery. Pre-operative haematological and biochemical profile of the patients was comparable in the two groups. Choice of anaesthesia was left with the anaesthetist. In each case the time taken for closure of abdominal wall, post operative cough, paralytic ileus, formation of seroma or haematoma, wound infection and wound dehiscence were carefully noted. The patients were followed up for the development of hypertrophic scar and incisional hernia for upto three months postoperatively.

Technique

We used No. 2 silk. The skin along with subcutaneous fat is moved laterally vis-à-vis fascia by lightly engaging the skin with the needle, without actually piercing it, and moving the needle away from the plane of closure just before traversing the abdominal wall (Fig. 1). As the needle travels the skin and fat the ipsilateral fascia of the anterolateral muscles of the abdominal wall is pulled towards the plane of closure so as to fix it in an unretracted position (Fig. 2). Both these steps can be done in one uninterrupted motion brings the fascia in a less retracted more medial relationship to the position of the skin. The needle then travels through the ipsilateral rectus muscle and parietal peritoneum. Since the approximation of the fascia is the basic ingredient of sound wound closure, this is the layer which is approximated next by taking the needle through the contralateral wound margin. Care is taken to bring the fascia in a more medial relative position than the skin and subcutaneous fat by retracting the skin laterally as the needle passes through it (Fig. 1). The stitches are placed one cm apart. The strands of each suture are successively pulled in opposite direction which

brings the fascia firmly together (Fig. 3). One by one the sutures are tied simply without tension over the rubber tubing. Tying of each suture is facilitated by the assistant holding the strands of the next suture. Rarely, some additional skin sutures were required to obtain good approximation of skin edges.

Observations

The mean age of patients in Group I was 31 ± 0.32 as compared to 31 ± 0.34 in Group II. Table I shows the distribution of cases according to the operative procedures in the two groups. The average time taken to close the abdominal incision was 8.9 ± 0.3 minutes in Group I and 13.1 ± 0.4 minutes in Group II, the difference being statistically significant. The complications occurring in the two groups are shown in Table II. Group I had a slightly shorter postoperative hospital stay as revealed by Table III.

TABLE I
Operative Procedure

Operations	Group I	Group II
<i>Obstetrical</i>		
1. L.S.C.S.	24	27
2. Hysterotomy with Ligation	12	04
<i>Gynaecological</i>		
1. Hysterectomy	08	15
2. Laparotomy	05	04
3. Myomectomy	01	00
Total	50	50

Discussion

Until recently, layered closure of the abdomen was considered sacrosanct, with great emphasis on the closure particularly of the peritoneal layer. It is now fully realised both from clinical observation and

TABLE II
Post Operative Complications

Complication	Group I		Group II	
	No.	%	No.	%
1. Seroma	01	02	02	04
2. Haematoma	00	00	04	08
3. Wound Infection				
(i) Mild	05	10	06	12
(ii) Moderate	03	06	03	06
(iii) Severe	01	02	01	02
4. Wound Dehiscence	00	00	01	02
5. Hypertrophic Scar	04	08	03	06
6. Incisional Hernia	00	00	01	02

TABLE III
Post Operative Stay in Hospital Morbidity

Range of Stay	Group I	Group II
10-15 Days	43	40
16-20 Days	04	05
More than 20 Days	03	05
Total	50	50

from laboratory animal studies that healing of the incision takes place by formation of dense fibrous block which unites the opposing faces of the laparotomy wound enmasse. The purpose of the suture is to coapt the wound edges and to act as a splint while this dense fibrous scar deposits and matures (Jenkins, 1976). This has encouraged single layer closure procedures throughout various surgical clinics in the world. A wound closed in single layer is less prone to haematoma formation, wound infection, wound dehiscence and incisional hernia as compared to the one closed in layers.

The incidence of haematoma formation in control group as against none in the study group in this series lends support to our assumption that the Group I was free from haematoma formation because there was no dead space left between various layers of abdominal wall as usually happens when abdomen is closed in layers. If, at all,

there is any oozing or bleeding, it finds a ready outlet between the stitches. We have not found any statistically significant difference in the incidence of wound infection in the two groups. Our results are not however in agreement with those of Jones *et al* (1977), who had a wound infection rate of 27.5 per cent in wounds closed conventionally using catgut. This incidence was brought down to 0.85 per cent by using alloy steel figure-of-8 sutures.

We have observed a 2 per cent incidence of wound dehiscence in Group II as against none in Group I. So a woman with conventional closure of abdomen wound is more prone to wound dehiscence in Group II than the one with single layer closure. The incidence of wound dehiscence has been reported to vary from 0 to 14 per cent by different workers (Jones *et al*, 1941; Goligher *et al*, 1975; Singh *et al*, 1981).

Abdominal wound disruption is one of the most serious post operative complications. In spite of the increased knowledge of wound healing by pre and post operative care, surgical technique and suture materials; the incidence of wound disruption has noted to be fairly constant and is associated with high mortality. Obesity, neoplasm, infection, anaemia, broncopulmonary disease, ileus corticosteroid therapy, prior radiation

treatment, diabetes mellitus and excessive vomiting have all been associated with increased wound disruption. The remarkable reduction in wound dehiscence rate by single layer closure technique gives the method an important place in closure of abdominal wall especially in cases where the postoperative period is likely to be turbulent with more likelihood of wound dehiscence. The chances of stitch cutting through are remote.

There was no case of incisional hernia in Group I and one case in Group II. This incidence is lower than reported by many workers.

Ellis (1983) has summarised the factors associated with incisional hernia as old age, male sex, obesity, bowel surgery, type of suture, chest infection, abdominal distension and wound infection. He has not been able to eliminate incisional hernia through single layer closure. One of the advantages of mass closure technique as pointed out by Mann *et al* (1962) is that the closure being secure even cachectic patients can be allowed to get out of bed very early post-operatively. It avoids the complications resulting from forced confinement.

In our view single layer closure of anterior abdominal wall should be taught as part of complete training programme for the young surgeons. It would provide the contemporary trainee with another valid option for the prevention of morbidity (wound dehiscence, haematoma formation and incisional hernia) in his patient when predisposing conditions provide ample opportu-

nity and justification. We hope our study will convince many surgeons to have a fresh look into the problem of laparotomy wound closure and in the near future we would find many advocates who attach significance to this procedure.

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See Figs. on Art Paper III