Is Catgut Really Obsolete? Experience with Buried Subcuticular Catgut Sutures in Operative Wounds

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Abstract

A good scar after surgery is desirable. Skin closure with subcuticular sutures is known to give better scars. Absorbable sutures reduce suture track infection. Catgut is a monofilament absorbable suture, which has not been generally recommended for skin for fear of infection and dehiscence. Buried subcuticular sutures using catgut were given in 350 cases after surgery. Disorders known to impair wound healing were excluded. Infection and dehiscence was noted in only 4.3% cases. Dehiscence in the absence of wound infection was seen in only two cases (0.6%). Excellent healing with fine linear scars was the result in 92% patients. Catgut can be safely used for skin closure by the described technique of buried subcuticular sutures in clean surgical wounds with gratifying results. It has advantages over its synthetic counterparts of easy availability, economy and good handling. The fear of poor result with catgut as a skin suture is unfounded

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Key Words : Catgut; Scars; Sutures; Wound healing.

Introduction

A well-healed and cosmetically acceptable scar after elective surgery is the obvious desire of both patient and surgeon. The cosmesis of visible scar depends, in addition to good wound healing, on the technique of skin closure and the suture material used. Subcuticular sutures are cosmetically better as they leave no suture marks. As compared to simple skin closure, less evidence of scar expansion may be seen with subcuticular closure after six to nine months.

Skin wounds gain tensile strength slowly but the skin or subcuticular sutures need only be strong enough to overcome the natural skin tension as the wound stress is taken by fascia [1]. Both absorbable and non-absorbable sutures can be used for subcuticular closure. Non-absorbable sutures have been generally considered to be better than absorbable ones in wound closure for the skin on the premise that they incite less tissue response and result in an aesthetically better scar. Absorbable sutures have the advantage of obviating the need for suture removal with obvious benefit in children. Further, knots can be buried, thus reducing the possibility of suture track infection. Monofilament sutures are preferable as multifilament sutures can provide a haven for the microbes with increased incidence of infection and poor scar cosmesis.

Catgut is a monofilament absorbable suture with good tensile strength that retains optimum strength to hold tissues together. It is smooth and pliable, has good knotting property and disappears completely be-

tween 60 and 120 days depending on its size [2]. The advent of newer synthetic sutures has prompted some surgeons to start writing the epitaph for catgut [3,4]. The cost effectiveness of catgut coupled with good results will ensure, particularly in developing countries, that this good friend is not consigned to history prematurely.

Catgut is generally not recommended for skin closure except in very fine sizes in children [5,6]. Our experience with buried subcuticular closure of operative wounds with catgut in 350 cases is reported.

Material and Methods

Buried subcuticular catgut sutures for closing operative incision were used in 350 elective cases using 00 or 000 chromic catgut. Patients with disorders known to impair wound healing, eg. diabetes, uremia, malnutrition and malignancy were excluded from the study. Antibiotic usage was limited to a single per-operative intravenous dose (Ampicillin/Cloxacillin and Gentamicin) in most cases. Two further doses were given post-operatively in clean contaminated cases. In urologic cases where drains/catheters were left for longer time; antibiotics were continued till their removal. No further antibiotics were given in all other cases unless indicated by wound infection when appropriate regime was started depending on the culture and sensitivity test. Wounds were first inspected after 48 hours and thereafter left open. The wounds were then systematically evaluated as per the following scale [7].

Grade 0 - No reaction, normal healing.

Grade 1 - Edema/Induration present.

Grade 2 - Edema and Erythema (Probable infection)

(Erythema was recorded only when it extended

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TABLE I

Operation	No. of cases	Wound reaction				Dehiscence		Scar type	
		Gr0	Gr1	Gr2	Gr3	Type A	Type B	I	II
Herniotomy	62	54	8	-	-	-	-	62	-
Herniorrhaphy	66	30	21	8	7	1	7	56	10
Hydrocelectomy	57	53	4	-	-	-	-	57	-
Varicocele ligation	21	13	3	4	1	-	1	19	2
Cholecystectomy	15	6	5	2	2	-	2	11	4
Truncal vagotomy and Gastro-jejunostomy	2	-	1	1	-	-	-	2	-
Epigastric hernia repair	7	2	4	1	-	-	-	6	1
Appendectomy	25	12	8	4	1	1	1	23	2
Ureterolithotomy	16	9	5	2	-	-	-	14	2
Pyelolithotomy	4	2	1	1	-	-	-	3	-
Cystolithotomy	3	1	1	1	-	-	-	3	-
Fibroadenoma breast excision	19	15	4	-	-	-	-	19	-
Thyroidectomy	6	3	1	2	-	-	-	6	-
Misc (sebaceous cyst, muscle biopsy, lipoma, etc.)	47	28	9	6	4	-	4	41	6
Total	350	228	74	33	15	2	15	322	28
Percentage		65.1	21.1	9.4	4.3	0.57	4.3	92	8

Gr - Grade

beyond 5 mm from the wound margin since catgut is known to incite variable local inflammation.)

Grade 3 - Edema, Erythema and Pus (Definite infection)

Since catgut has been reported to have variable loss of strength and dissolution in wounds [2,6]; the wounds were also classified for dehiscence into two types viz:

Type 'A' - Dehiscence without definite infection (Wound grade 2 or less)

Type 'B' - Dehiscence with definite infection (Wound grade 3)

Patients were reviewed at intervals for a period up to six months. The scars were then classified as :

Type 1 - Fine linear cosmetic scar, patient satisfaction good.

Type 2 - Ungainly /stretched/expanded scar, patient satisfaction not good.

Table 1 represents the consolidated observations in 350 cases.

Surgical Technique

All wounds were closed without tension after accurate approximation of fascia. Abdominal incisions were closed by mass closure with nylon or polypropylene. In all other cases even fascial closure was done with catgut. Meticulous haemostasis was ensured and wound irrigated with saline before closure. A deep intradermal suture was placed at one end of the wound with an inverted knot. The short end of the suture was cut and the needle brought out at the angle of incision (Fig 1A and 1B). The suture was then continued as subcuticular suture. At the other end of the wound, the needle was brought out through the skin about 1.5 cm away.

Keeping the thread under slight tension, the needle was re-entered at the point of emergence and finally the 'T' was completed (Fig 2A to 2D). The suture was then cut flush with the skin. In scrotal cases, the Dartos layer was closed by continuous catgut suture and it was returned in the skin as subcuticular suture. The end was tied to the end of Dartos suture, thus burying the knot.

Results

Patients' age ranged from 06 months to 73 years with a male female ratio of 2.8:1. The incision length ranged from 2 to 15 cm with an average length of 4.8 cm. Gross wound infection was seen in only 15 cases (4.3%). While 65.1% cases had excellent healing with almost no reaction, intermediate grade wound reaction was seen in the remaining (30.6%). These figures are highly comparable to those of dextron (polyglycolic acid), polyethylene and nylon in a comparative study by Mouzas and Yeadon [7].

Maximum incidence of wound infection was after herniorrhaphy (10.6%) and cholecystectomy. The common factor among these patients was obesity. All patients having gross post-operative infection had partial or complete dehiscence of the skin wound which then had to be sutured secondarily. Wound dehiscence in the absence of infection was seen in only two cases. One was a case of tuberculous appendicitis and the other was a young adult operated for bubonocoele. The possible explanation in these cases could be fraying or weakening of the suture during handling or an accelerated absorption of the suture. Both these wounds had only partial dehiscence of skin and healed without secondary suturing giving rise to a slightly stretched scar at one end of the wound.

The best results were seen in young children where cat-

gut as a skin suture incited almost no reaction at all. The wounds healed with hardly a visible scar. After our initial experience in these cases the patients were discharged in the evening after surgery and followed up as outpatients. Excellent results were also seen in hydrocele cases where there was no incidence of wound infection. A continuous Dartos suture provided good haemostasis and these patients were discharged after the first wound inspection and followed up in OPD.

Good, fine linear scars were achieved in 92% cases with subcuticular suture using catgut and patients were happy with their scars. 28 patients were not so happy and these included 15 cases that had gross infection of their wounds. Of the remaining 13 cases, scar stretching or expansion was seen in 8 and hypertrophy in 5 patients. Cholecystectomy by Kocher's incision and scars on the back showed more hypertrophy, while inguinal and lower limb scars showed more expansion or stretching after six months. There were no cases of post-operative sinus formation after healing

with or without extrusion of catgut in this series.

Discussion

Sutures have been used to coapt wound edges since the dawn of surgery. Catgut was in use in the times of

Fig. 1a : Starting the buried subcuticular suture; the inverted deep intradermal stitch

Fig. 1b : Starting the buried subcuticular suture; coming out at the angle of the wound

A

B

C

D

Fig. 2A,b,c,d : Completing the buried subcuticular suture

Galen though its use was popularised by Ambroise Pare [8]. It has been a subject of controversy as to its reaction and absorption and has been condemned by many while remaining the favourite of others [9]. Its use for skin closure has not been recommended on the grounds that it may act as a growth medium for bacteria, has variable absorption and cellular response of tissues is often severe enough to impede wound healing [5,6].

Van Winkle et al, on the other hand, in an experimental study on dogs found lowest incidence of persistent infection with catgut closure of skin wounds even when both plain and chromic catgut were present at 120 days. Subsequently, others working in their laboratory suggested that catgut and polypropylene were the most satisfactory sutures for skin closure in dogs [10]. They also reported that wounds sutured with absorbable sutures were stronger at 70 days and catgut either plain or chromic, produced little tissue reaction after 21 days compared to other materials. Postlethwait et al in a study on human tissue reactions to sutures suggested that reactions in humans are generally similar to but less intense than experimental animals except rats [11]. Transfer of the findings in animal studies, according to them, would therefore be acceptable with only moderate limitations. In humans catgut has been recommended for skin sutures in hand surgery, as it does not lead to epithelial down growth and keratin plug formation in the track as seen with the standard suture materials [12]. In a combined clinico-experimental study Gautam et al comparing catgut with dextron, reported a higher incidence of post-operative pain, inflammation, wound infection and dehiscence with catgut [4]. This study however, appears flawed as the skin was closed with either thread, silk or nylon which are known to have higher tissue reaction and infection rates as compared to catgut [7,8,10]. Also, any surgical unit having gross infection and wound dehiscence in 41.7% of its patients after clean elective surgery has to look for reasons beyond suture material before condemning it to obsolescence. This is further borne out by the fact that their reported rates of infection (18.1%) and dehiscence (13.9%) with dextron are significantly higher than catgut in our study. It should not be construed from our study that catgut is a suture without limitations, or that synthetic absorbable sutures have no merits. Both of these aspects have been well researched and documented [1,2,5,6,8,9]. It is not the ideal suture, but for that matter none is. No suture material at present possesses all the properties expected of an ideal suture [5,9,13]. The hitherto held taboo against catgut as a skin suture however, is not

valid. In selected clean cases of elective surgery, skin closure with catgut by buried subcuticular suture gives gratifying results. The suture is easily available to surgeons in peripheral hospitals and is immensely economical compared to its synthetic counterparts. Its handling is good with no snagging and accurate knotting [14]. The technique of buried subcuticular sutures is also easy to follow and does not demand any extra technical skill. The Halstedian dictum epitomized by Marcy, "a wound made and maintained aseptic in well vitalized structures held at rest in easy coaptation by buried sutures will be followed by a non-inflammatory primary union", still holds good [15]. There is time yet before the sun sets for catgut, at least till sutureless surgery becomes available to every surgeon and every patient.

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