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MODIFIED VERTICAL BURIED MATTRESS SKIN SUTURE. INNOVATIVE TECHNIQUE

Oncology

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ABSTRACT

BACKGROUND Skin wound suture should provide a firm tension-relieving closure, minimal usage of intradermal materials and wound-edge eversion. Authors describe their modification of the wound closure method which leads to the above results.

METHODS We used modified mattress buried vertical suture for skin closure in 31 patients and compared results with control group (31 patients) in which we provided traditional vertical mattress buried suture. Modified suture has semicircular view on the wound transect, in the vertical surface. Sutures were applied in one row in study group. Traditional vertical mattress buried sutures were combined with an intradermal running suture in control group.

RESULTS Modified buried vertical suture was applied for 31 patients with good results. There were no cases of any complications during the 12 months of follow up. Scars were flat and thick. The same results were in control group (31 patients) but the difference was in usage of amount of suturing material. We implemented only the one row suture in the study group. There were two rows in control group. Modified suture showed the same result as the suture with two rows.

CONCLUSION Modified semicircular mattress buried vertical suture seems to be effective for cosmetic skin closure.

Level IV: Evidence obtained from multiple time series with or without the intervention, such as case studies. Dramatic results in uncontrolled trials might also be regarded as this type of evidence.

KEYWORDS

buried mattress suture, scar, wound closure technique.

INTRODUCTION

"What will the scar look like?" patients often ask their surgeon. Aesthetic aspect of a postoperative wound is an important outcome of the operation [1], quality sutures also lead to good wound healing without any complications.

In most cases mattress sutures are used for wound closure of the skin. There are two types of mattress sutures: vertical buried sutures and horizontal buried sutures [2-7]. Buried mattress sutures are used together with the intradermal running suture. Combination of different sutures provides better juxtaposition of the wound edge and leads to tension relief [8].

Buried mattress sutures result in optimal matching of wound edges and reduction of wound tension [9].

Wound eversion is another benefit of mattress sutures. [10-13]. Mattress sutures upbeat wound edges due to more tight tension and light compression. As a result, the scar becomes flat and thin. There are different modification of buried mattress sutures [14-15]

We used our modification - semicircular mattress buried vertical suture for skin closure [17].

Statistical analysis

The software package was used for statistical analysis MedCalc v.18.9 (MedCalc Software Inc., Broekstraat, Belgium, 1993–2018). We used the Shapiro-Wilk test to check for normality of numerical data. The arithmetical average and standard deviation (SD) were calculated for the presentation of quantitative data,. Comparison of quantitative data was carried out by the t-test. Frequency of events were compared using Fisher's exact test or Chi-square (Yates corrected) test. All tests of significance were two tailed with the critical level of $p = 0,05$.

Method description

Suture is vertical, interrupted, buried and mattress [17]. Suture looks semicircular on the wound transect, in the vertical surface. This suture starts from the internal part of the wound. We used polydioxanone suture material in all cases. Needle goes up from subcutaneous adipose (Fig.1, point A) to the skin surface and exits from the point which is 5-7 mm from the skin edge (Fig.1, point B). After that the needle inserts in same point (exit point) but spreads in the horizontal direction subcutaneously in the papillary dermal level and exits above the entering point (Fig.1, point C) on the wound edge. On the opposite part of the wound the needle enters in papillary dermal level (Fig.1, point C1), spreads in the horizontal direction and exits from the point at a distance of 5-7 mm from the wound edge (Fig.1,point B1). After that the needle returns to the same point but goes to the subcutaneous adipose and exits under the entrance point (Fig.1, point A1) just opposite entering point. The beginning and the end of the thread are opposite to each other. Then we tie the thread ends and make a knot which is buried in the subcutaneous tissue. Tight loop results in precise apposition of the wound edge and relieves tension. The thread is not visible and only small pits are seen where the thread entered and exited the skin.

Figures 1 and 2 show the wound transect of the modified semicircular vertical buried mattress suture.

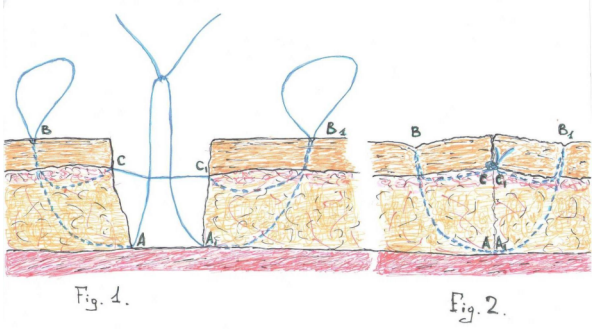

Fig. 1, 2. Modified semicircular vertical buried mattress suture before being tied (Fig.1) and after being tied (Fig.2).

In control group we used vertical interrupted buried mattress suture (the first row) and intradermal continues suture (the second row)

All procedures followed were in accordance with the ethical standards

of the responsible institutional committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The protocol of trial was approved by The O. Bogomolets National Medical University Ethics committee. The patients signed the informed consent form

RESULTS

We have used this method in 31cases, 7 male (22,6%) and 24 (77,4%) female, range 21-90 years, mean age 53 years (Table 1). All patients returned for 3-month follow up. Control group consisted of 31 patients. There weren't the significance differences between the groups by their characteristics (p>0,05, see Table 1).

Table 1. Subject demographics and surgical data

Characteristics	Study group, N = 31	Control group, N=31	P level
Sex (%) Male Female	 7 (22,6) 24(77,4)	 8 (25,8%) 23(74,2%)	>0,99
Mean age, y.o.	(SD) 53,0 (15,7)	(SD) 52,0 (14,3)	0,79
Race (%) Caucasian	 31 (100)	 31 (100)	>0,99
Surgical data			
Procedure type (%) Excision Tumor removing	 17(54,8) 14 (45,2)	 16(51,6) 15(48,4)	>0,99
Surgery site (%) Torso Upper extremity Lower extremity Breast	 15 (48,4) 2 (6,5) 5 (16,1) 9 (29,0)	 14(45,2) 3(9,7) 5(16,1) 9(29,0)	0,97
Training level of surgeon and no. of closures performed (%) Attending Procedural fellow	 28 (90,3) 3(9,7)	 27 (87,1) 4(12,9)	>0,99

Inclusion criteria: surgical treatment of benign or malignant tumors of the skin and breast, age after 18 years,

Exclusion criteria: inflammation of the skin around the tumor, necrosis of the tumor, radiation or chemotherapy treatment before operation.

We measured wide of the scar, height, assessed hypertrophic scar formation.

One case is presented below.

The patient was a 27 years old girl with fibroadenoma of the right breast. We performed tumorectomy through the periareolar incision and three sutures were applied on the wound; all the three were vertical, semicircular, mattress and buried.

Left picture (Fig.3) shows two tied sutures and the last one is being tied. Right picture (Fig.4) shows result 3 months later

Fig.3 **Fig.4**

Figure 3, 4. Modified semicircular vertical buried mattress suture being tied and the scar view 3 months later.

DISCUSSION

Presented modified semicircular mattress sutures are generally easy for surgeons. We applied this method and called it semicircular modified vertical mattress buried suture. Its advantages are: 1. This suture involves wide subcutaneous tissues for precise apposition of the wound edge. 2. It provides wound eversion by tight contact of the opposite wound edges. This method is similar to the interrupted percutaneous vertical mattress suture, as G.A.M. suture, but it is different in the wound transect [15]. The amount of tissue is larger and that is why our suture can be stronger. This suture can be applied in the one row. We do not need to add intradermal continuous suture. It provides the same juxtaposition of the wound edge and leads to tension relief. We applied deep sutures on adipose where it was needed if the wound was deep and thick. This method is good for skin suturing on the back, extremities, chest and abdomen.

Statistical analysis was conducted to compare the modified suture technique to standard buried mattress techniques to establish advantages of the above method. A longer follow-up period is required for these studies.

CONCLUSION

The described method provides good cosmetic results. The semicircular buried vertical suture can be valuable tool among the arsenal of methods for postoperative cosmetic skin closure. Modified suture showed the same result as the suture with two rows in the control group.

Conflict of Interests

Valeriy Cheshuk, Evgen Cheshuk, Mykola Anikusko, Vitaliy Gurianov declare that they have not conflict of interest.

Competing interests

The authors declare no competing interests.

Ethical standards statement

All procedures followed were in accordance with the ethical standards of the responsible institutional committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. I confirm that the protocol of trial was approved by The O. Bogomolets National Medical University Ethics committee.

Informed consent

Informed consent was obtained from all patients for being included in the study.

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