Use of 5-0 Fast Absorbing Gut versus 6-0 Fast Absorbing Gut during cutaneous wound closure on the head and neck: A randomized evaluator-blinded split-wound comparative effectiveness trial

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Background: Absorbable suture material (Fast Absorbing Gut [FG], Ethicon, Somerville NJ) is often used for patient convenience; however, the optimal diameter of FG sutures is debatable.

Objective: To determine whether the use of 6-0 FG during repair of linear cutaneous surgery wounds on the head and neck improves scar cosmesis compared with the use of 5-0 FG.

Methods: This was a prospective, randomized, split-scar intervention in patients undergoing repair of linear cutaneous wounds on the head and neck. The scar was assessed 3 months after surgery via the Physician Observer Scar Assessment Scale (POSAS), a validated instrument.

Results: The difference in the sum of the POSAS component scores for 6-0 FG (12.03) compared with that for 5-0 FG (13.11) was not statistically significant (P = .26). Observer overall opinion was similar for both interventions, at 2.49 for 6-0 FG vs 2.64 for 5-0 FG (P = .54). The difference in the number of complications in the 5-0 FG group (15) vs the 6-0 FG group (10) was not statistically significant (P = .40).

Limitations: Single-center study with wounds limited to the head and neck in white individuals, with a predominance of men.

Conclusion: For linear repair of cutaneous wounds, 6-0 FG was not statistically different for cosmetic outcomes, scar width, and complications compared with 5-0 FG. (J Am Acad Dermatol 2019;81:213-8.)

Key words: 5-0; 6-0; cutaneous closure technique; cutaneous surgery; Fast Absorbing Gut; scar evaluation; suture caliber; suture diameter; suture size.

Absorbable suture materials (Fast Absorbing Gut [FG], Ethicon, Somerville NJ) are effective for wound closure on the face and neck and are associated with good cosmetic outcomes.[1] Because they do not need to be removed, they can save the surgeon time and lessen patient anxiety and

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discomfort.[2] The optimal diameter of FG sutures is debatable, because larger-width and smaller-width sutures each have benefits and disadvantages.

On the one hand, smaller-diameter sutures are more prone to breaking than larger-diameter sutures. This becomes problematic during suturing, when breakage results in slower procedure times, and also after the patient goes home, where improper wound edge alignment, wound inversion, or even dehiscence may result. Smaller-diameter sutures may also be more likely to cut through tissue than larger-diameter sutures.

Larger diameter sutures, on the other hand, introduce more foreign material into the wound, which could result in greater tissue reactivity and inflammation as well as in a larger substrate for bacterial growth and potential infection.[3-6] Furthermore, some hypothesize that larger sutures will result in larger track marks and more unsightly scars.

Randomized comparative effectiveness trials on this topic are absent or few in number. We therefore used a split-wound/split-scar model to determine whether the use of 6-0 FG improves scar cosmesis compared with 5-0 FG for the repair of linear cutaneous surgery wounds on the head and neck.

CAPSULE SUMMARY

- Fast Absorbing Gut sutures are often used in dermatology, but there are no studies that demonstrate the effect of suture size on wound cosmesis.
- There are no significant differences in wound cosmesis using 5-0 versus 6-0 Fast Absorbing Gut sutures on the head or neck. Surgeons may safely use whichever they prefer.

METHODS

Study design, registration, training, and ethical consent

In this prospective, randomized, evaluator-blind, registered (Clinicaltrials.gov identifier: NCT03303027) trial, patients from the University of California, Davis Department of Dermatology were continuously enrolled between September 2016 and January 2017 with follow-up completion in April 2017. Ethical approval was obtained through the University of California, Davis Institutional Review Board (#902404) before the study's onset, and all patients provided verbal and written consent to enrollment. A split-wound/split-scar model, which has been used in the past to assess cuticular suturing techniques, was used to minimize the number of uncontrolled variables.[7-10]

Patient eligibility and a priori power analysis

Inclusion criteria for study enrollment included age 18 years or older, scheduled cutaneous surgical procedure on the head and neck with predicted primary closure, ability to give informed consent, and willingness to return for a follow-up visit in 3 months. Exclusion criteria included wounds with predicted closure length of less than 3 cm, incarceration, pregnancy, age younger than 18, mental handicap, inability to understand written or oral English, or inability to consent.

An a priori power analysis using a paired *t* test with 90% power indicated that 50 study participants would be needed to detect a 3-point difference on the validated 60-point Patient Observer Scar Assessment Scale (POSAS) scale with an anticipated attrition rate of 20%.

Randomization, allocation, concealment, and interventions

Surgical wounds after Mohs micrographic surgery or surgical excision were divided in half, with the left or superior side of the surgeon labeled as "A" and the right or inferior side labeled as "B." A randomized sequence was generated using an Internet tool (random.org) and uploaded into an allocation concealment module of the Research Electronic Data Capture (REDCap; Vanderbilt University, Nashville, TN). The web-based data collection form was completed by a nurse uninvolved in the study. The REDCap module only reveals treatment allocation after enrollment and only 1 patient at a time.

Wound edges were undermined 1 cm to allow for easy placement of polyglactin 910 (Vicryl; Ethicon) subcuticular sutures using the buried vertical mattress technique.[11] The surgeon preferentially used 5-0 polyglactin 910, and if the suture ruptured during wound edge approximation, 4-0 polyglactin 910 was substituted. After wound edge approximation with a single centrally placed subcuticular suture, additional sutures were placed equidistant from the center of the wound such that each side received the same number of subcutaneous sutures under similar conditions. Wound edges were fully approximated with the buried vertical mattress subcuticular sutures such that minimal tension was present at the wound edge surface.

After deep sutures were placed, a predetermined, concealed randomization number was obtained from the REDCap randomization module, which specified how side A was to be treated. Side A was always closed first, and side B was treated the opposite way from A, with both sides treated in a

Abbreviations used:

FG: Fast Absorbing Gut
POSAS: Patient Observer Scar Assessment Scale

simple running pattern. Cuticular suture spacing was performed at 3-mm to 5-mm intervals, with an effort to make the spacing the same for both interventions. A prior randomized trial showed that there was no significant difference in cosmetic outcomes between cuticular sutures spaced 2 mm apart and 5 mm apart[12]; therefore this suture interval would be unlikely to be a source of bias. The suture material was pulled at enough tension to align the epidermal edges only and was not meant to hold the wound together under any tension because the subcuticular sutures were serving that purpose.

Postoperative digital images were obtained and recorded in the REDCap database in addition to demographic data, wound length, and treatment assignment. Although the study participant was blinded to the intervention assignments, the sutures would be visible to the patient.

After the wound was sutured, petrolatum and a sterile pressure bandage were applied over it. The patient was instructed to abstain from all physical activity for 7 days and to remove the pressure dressing in the shower 24 hours later. After removal of the dressing, the patient was asked to apply petrolatum to the wound with a cotton-tipped applicator and to cover the area with a sterile dressing daily for 1 week.

Assessments

The primary outcome of the cosmetic appearance of the scar was assessed 3 months after the surgery. Secondary outcomes included the incidence of dehiscence, suture abscesses, or noticeable track marks. The width of the scar for both halves at 1 cm from the midpoint was also assessed. A 3-month time frame was chosen because surgical assessments of scars at this time tend to be similar with those at 12 months, and any differences between interventions would be less likely to be detected at a later time.[13-15]

Primary and secondary outcomes were evaluated in person by the patient and by 2 blinded observers using the validated POSAS.[15] The POSAS has been proven as a valid outcome measure when 2 independent observers evaluate scars[16-18] and has been used in several surgical studies.[8,9,19-21] This scale is based on a 10-point scoring system, with a score of 1 representing normal-appearing skin and 10 representing the worst scar imaginable.

Participants completed the patient-centered POSAS to assess pain, pruritus, color, thickness, stiffness, irregularity, and overall opinion of each half of the scar. The 2 blinded observers, who were not present during the procedure, were asked to evaluate the vascularity, pigmentation, thickness, relief, pliability, and surface area and to provide an overall opinion of each half of the scar. The primary outcome measure corresponded with the mean of the sum of the observer scores. The total score can range from 6 to 60, with lower scores being more representative of normal-appearing skin.

Complications that were prospectively recorded included wound dehiscence (categorized as superficial or deep), infection, bleeding hematoma, seroma, suture abscess (defined as an inflammatory papule arising around a buried subcuticular suture), hypertrophic scaring (defined as scar tissue that is elevated above the plane of the surrounding skin), and track marks (defined as scars that follow the course of cuticular suture material). Superficial wound dehiscence was defined as partial separation of the 2 wound edges without exposure of the subcutaneous fat, and deep dehiscence was defined as wound separation with exposure of the subcutaneous fat. Track mark incidence was recorded because some believe that larger-diameter suture material may lead to more noticeable track marks. However, factors such as suture tension may also be important. This study was not designed to assess causes of this complication.

Table I. Demographics

Characteristic	Value* (N = 50)
Age, y	69 (32-95)
Male sex	39 (78)
White race	50 (100)
Training level of surgeon	
Attending	20 (40)
Mohs fellow	27 (54)
Resident	3 (6)
Location of surgical procedure	
Cheek	24 (48)
Forehead	12 (24)
Preauricular	3 (6)
Temple	6 (12)
Other†	5 (10)
Indication	
Mohs micrographic surgery	50 (100)

*Data are presented as median (range) or as number (%).
†2 chin, 1 lip, 2 neck.

Statistical analysis

Data were analyzed based on the intention-to-treat principle. Summary statistics were applied to

Table II. Scar outcomes

Outcome Measure	Fast Absorbing Gut 5-0	Fast Absorbing Gut 6-0	*P* value
Evaluable patients, No.	46	46	
Scar width, mean (SD), mm	0.78 (0.69)	0.74 (0.57)	.67
POSAS score, mean (SD)			
Patient			
Pain	1.39 (1.56)	1.22 (1.33)	.17
Itching	1.46 (1.72)	1.26 (1.38)	.22
Color	2.63 (1.83)	2.63 (1.87)	1.00
Thickness	2.20 (1.75)	2.74 (2.07)	.15
Stiffness	2.00 (1.43)	2.17 (1.89)	.55
Irregularity	2.20 (1.56)	2.59 (2.10)	.31
Overall opinion	2.37 (1.40)	2.59 (1.68)	.49
Sum of patient assessments	11.87 (6.05)	12.61 (6.87)	.54
Blinded reviewer			
Vascularity	2.34 (1.09)	2.10 (0.99)	.20
Pigmentation	1.76 (0.84)	1.62 (0.77)	.25
Thickness	2.26 (1.32)	2.11 (1.32)	.45
Relief	2.36 (1.30)	2.12 (1.04)	.27
Pliability	2.11 (1.39)	2.00 (1.17)	.58
Surface area	2.28 (1.09)	2.09 (0.98)	.33
Overall opinion	2.64 (1.24)	2.49 (1.31)	.54
Sum of observer assessments	13.11 (5.74)	12.03 (5.03)	.26
Complications, No. of patients			
Superficial dehiscence	2	1	
Suture abscess	3	1	
Noticeable track marks	9	7	
Hypertrophic scar	1	1	
Sum of complications*	15	10	.40

POSAS, Patient Observer Scar Assessment Scale; *SD*, standard deviation.
*Statistical analysis was performed only on the sum of complications according to a predetermined data analysis plan to reduce chances of spurious findings.

describe the baseline demographic and clinical characteristics of the patient population. The differences in patient and observer POSAS scores and complications were compared among the 2 suture sizes using a pairwise comparison. To assess differences in continuous outcomes between the 5-0 and 6-0 FG sutures, a paired *t* test was used to test the null hypothesis that the true mean difference would be 0. The Wilcoxon matched-pairs signed rank test was used for nonparametric evaluations, testing the equality of matched pairs of observations; the null hypothesis tested that both distributions are the same. All results achieving a 2-tailed *P* value of $<.05$ were considered statistically significant. All analyses were performed with Stata/MP 13 software (StataCorp LLC, College Station, TX).

RESULTS

The study screened 57 patients for participation, and 7 were excluded. Table I provides demographic details of the patients. The remaining 50 patients were enrolled after undergoing Mohs micrographic surgical procedures. One fellowship-trained dermatologic surgeon performed the study intervention in 20 patients (40%), 1 dermatologic surgery fellow in 27 (54%), and 3 different residents in 3 (6%). Of the 50 patients enrolled, 46 were available at the 3-month follow-up visit. Four patients could not return for evaluation within the study assessment period.

The difference in the sum of the POSAS component scores for 6-0 FG (12.03) compared with 5-0 FG (13.11) was not statistically significant ($P = .26$). The difference between the observer overall opinion for both interventions was also not statistically significant, at 2.49 for 6-0 FG versus 2.64 for 5-0 FG ($P = .54$). No statistically significant difference was found between the scar width for 6-0 FG (0.74 mm) and that for 5-0 FG (0.78 mm; $P = .67$). There was no significant difference in the mean patient POSAS scores between the sides of the scars for pain, itching, color, stiffness, thickness, irregularity, and

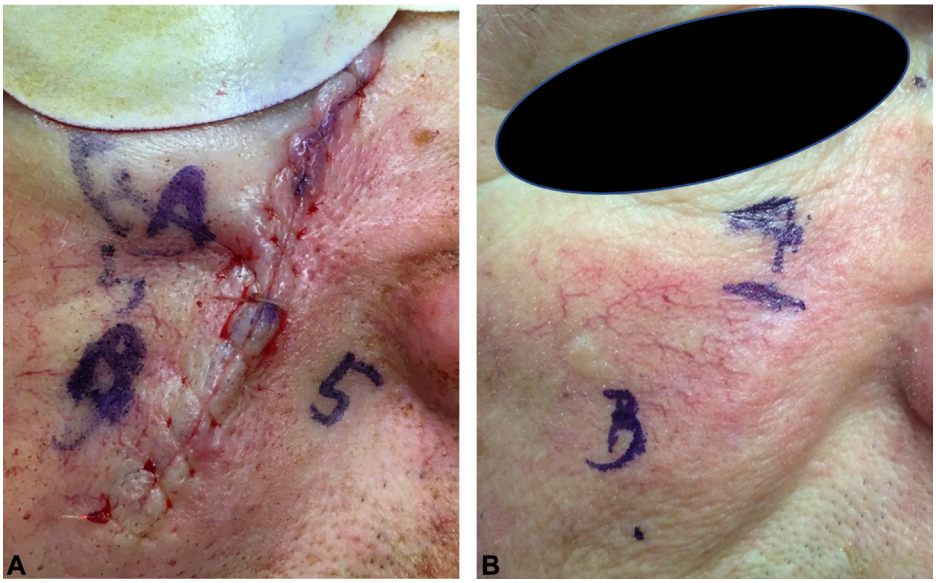

Fig 1. Postoperative wound and surgical scar. Representative surgical wound (**A**) immediately postoperatively and (**B**) at the 3-month follow-up. The 5-0 Fast Absorbing Gut suture was applied to side A of this wound, and 6-0 Fast Absorbing Gut was used to repair side B.

overall opinion. There was no significant difference between individual components of the blinded observer POSAS scores for vascularity, pigmentation, thickness, relief, pliability, surface area, and overall opinion at the 3-month assessment (Table II).

The difference in the number of complications in the 5-0 FG group (15) versus the 6-0 FG group (10) was not statistically significant (P = .40; Table II). There were 2 cases of minor wound dehiscence on the 5-0 FG side and 1 on the 6-0 FG side. Three suture abscesses were noted on the 5-0 FG side and 1 on the 6-0 FG side. Nine cases of noticeable track marks were noted for the 5-0 FG side versus 7 for the 6-0 FG side. A hypertrophic scar was noted along both sides of the scar in 1 patient.

DISCUSSION

The appearance of scars from Mohs micrographic or surgical excision procedures on the head or neck was not statistically different between those sutured with 6-0 FG and those with 5-0 FG (Fig 1). Complications also did not significantly differ between study groups.

Strengths of this study include a priori power analysis, true randomization, intervention concealment, blinded observer assessment, and the use of a validated scar assessment tool.

This study's primary limitation was its single-center nature. Multicenter trials typically include greater numbers of patients and are less susceptible to bias and sporadic findings. Given the treatment area was restricted to the face and neck, there may be a difference in wound healing when using different sizes of FG on other parts of the body.

Another limitation of this study is that all of the patients were white, and these results may not be the same in those with darker skin types. Because FG can be reactive, postprocedural erythema in patients of color may translate to postinflammatory hyperpigmentation. Although different surgeons performed the repairs, this variety would have improved external validity because experience level varies among surgeons in the community.

There are many variables important to individual surgeons in terms of what caliber suture is selected. The results of this study may not address every scenario, where some authors may feel 6-0 FG would be especially beneficial, such as on the eyelids or in patients with sebaceous skin. Most of the wounds in this study were on the cheek, forehead, and temple. These are common sites, and the results of this study will likely be relevant to surgeons' practices in those locations.

Although suture material and suture technique are often examined in the literature, the effect of suture diameter on cutaneous wound healing is rarely discussed. The results of this study indicate that there is no significant difference in cosmetic outcome between the use of 5-0 and 6-0 FG. Thus, a surgeon's decision regarding which FG suture size to use would best be made on a patient-by-patient basis or personal preference.

CONCLUSION

For linear repairs of cutaneous wounds on the face and neck, the result of using 6-0 FG for cosmetic outcomes was not significantly different from that of using 5-0 FG. Similarly, there was no statistically significant difference in scar width or complications.

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