Intradermal Sutures in Neurosurgery – Consecutive Series of 1322 Neurosurgical Interventions

Krasimir Minkin*, Naydenov Emanuil1, Gabrovski Kaloyan1, Dinev Enelin1, Hristov Hristo1, Sirakov Stanimir1 and Karakostov Vasil1

1Department of Neurosurgery, University Hospital “Saint Ivan Rilski”, Bulgaria
2Department of Neuroradiology, University Hospital “Saint Ivan Rilski”, Bulgaria

Abstract

Background: Previous reports on the techniques used to close surgical incisions in neurosurgical practice are very scarce. The traditional technique consists of interrupted closure with percutaneous non-absorbable sutures or staples.

Objective: The aim of this report was to investigate the safety, efficacy and patient perception of intradermal sutures applied non-selectively in all cranial, spinal and peripheral nerve neurosurgical interventions.

Methods: Our series includes 1322 neurosurgical interventions performed during a 5-year period from January 2014 to December 2018: 804 cranial, 504 spinal and 14 peripheral nerve interventions. We adhered to a protocol for closure involving the use of percutaneous running sutures with absorbable material in all cases. Wound healing was examined 24 h after surgery, 7 days after surgery and during the follow-up period. The mean follow-up was 14 months (range 1 week to 36 months).

Results: We observed 4 wound complications (0.3%) in this mixed neurosurgical series–2 bone flap osteomyelitis requiring bone flap removal and 2 superficial skin infections successfully treated by wound revision and antibiotics. All 4 complications were in the cranial group. All patients except these 4 complicated cases expressed their satisfaction regarding the absence of need for suture removal and the cosmetic results.

Conclusion: Our results suggest that intradermal sutures may be used routinely in all elective neurosurgical procedures–cranial, spinal or peripheral nerve interventions. This suturing technique is safe and fast to perform and achieves good cosmetic results.

Keywords: Cosmetic results; Incision closure; Intradermal sutures; Wound complications

Background

Several types of closures may be used to close the surgical incisions at the end of cranial, spinal or peripheral nerve neurosurgical interventions–percutaneous or intradermal stitches using interrupted or running sutures with absorbable or non-absorbable material. Papers focusing on this final step of neurosurgical operations are scarce [1,2]. The traditional practice consists of percutaneous interrupted closure with non-absorbable sutures or metallic staples. Since 2014, our team adopted a protocol of intradermal running sutures with absorbable material for all neurosurgical interventions. The aim of this report was to investigate the safety, efficacy and patient perception of this method.

Methods

Our series includes patients operated upon during a 5-year period from January 2014 to December 2018, and the skin closures were performed by one of the three leading authors (KM, EN, KG). One thousand three hundred twenty-two consecutive neurosurgical interventions were performed during this period. There were 118 reoperations (8.9%) and 247 interventions in children (18.7%). The series included 804 cranial operations, 504 spinal and 14 peripheral nerve interventions. The distribution of the patients according to surgical procedure and disease is presented in Table 1. Emergency trauma procedures were excluded because percutaneous stitches were usually applied. Chronic subdural hematomas, late spinal decompressions and stabilizations or delayed peripheral nerve repairs following traumatic injury were included in our study. This series included shaven and unshaven patients. Povidone iodine was used to scrub the skin of the patients.
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may have serious consequences. The intradermal sutures save
neurosurgical intervention, but underestimating its importance
complications.

The cosmetic results were satisfactory for all patients without wound
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speed of intradermal skin closure after 1 year of training was 3 cm/

We observe 4 wound complications (0.3% complications rate) in
this mixed neurosurgical series–2 bone flap osteomyelitis requiring
bone flap removal and 2 superficial wound infections treated by
wound revision. No wound-edge necrosis was observed. The average
speed of intradermal skin closure after 1 year of training was 3 cm/
min, which is comparable with the average speed for skin closure
achieved using percutaneous stitches with non-absorbable material.
The cosmetic results were satisfactory for all patients without wound
complications.

Skin closure is the final and probably the easiest step of each
neurosurgical intervention, but underestimating its importance
may have serious consequences. The intradermal sutures save
time (no need for more than one postoperative dressing), reduce
patient discomfort (no need for suture removal, which is especially
important in children) and improve cosmetic results (no suture
marks). The low rate of complications (0.3%) seems logical because
of the good dermal and epidermal approximation and the absence of
foreign material connecting the skin surface and the subcutaneous
space, which is present in patients with percutaneous sutures or
staples. Wound closure has rarely been discussed in the neurosurgical
literature, probably because of the low rate of wound complications in
neurosurgical practice [3]. Cho have described cyanoacrylate glue skin
closure in cases with limited-skin incisions for small craniotomies.
Paolini reported a low rate of complications (0.96%) after intradermal
sutures of elective craniotomies–1 case of cerebrospinal fluid
leakage and another case with superficial skin infection. There are
more papers on this topic outside of the neurosurgical area. Gal [4]
conducted an experimental study on rats and found that the wound
tensile strength of intradermal running sutures is significantly higher
than that of simple interrupted percutaneous sutures. A low rate of
complications, positive aesthetic results and patient preference were
reported for clean dermatological, cardiac and general surgeries [5-
7]. The clean character and the low wound complication rates for the
majority of the neurosurgical interventions suggest more widespread
application of intradermal sutures in neurosurgical practice.

Conclusion

Our results suggest that intradermal sutures may be used routinely
in all elective neurosurgical procedures–cranial, spinal or peripheral
nerve interventions. This suture technique is safe and fast to perform
and achieves good cosmetic results.

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