SUTURE MATERIAL- IT’S IMPORTANCE IN WOUND HEALING
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HOW TO CITE THIS ARTICLE:

ABSTRACT: Wound closure is an important aspect of wound healing. A wound may be caused by mechanical violence, infection of body tissues or deliberate traumatism like a surgical incision. Accurate apposition of wound edges, maintenance of haemostasis and respectful tissue handling during an operation are necessary to help the healing process. All post-operative cases do not show good healing process. Numerous factors play role in wound healing. Suture material is one of them. Selection of appropriate suture material, among other factors, is of immense importance in the matter of wound healing. By the term suture, we mean the material by which two surfaces are kept in position. The time of removal of sutures, size and types of suture used, also determine the quality of healing.

KEYWORDS: Suture material, Wound healing.

INTRODUCTION: MATERIALS AND METHOD: A prospective study of 105 cases was done from 1st January, 2014 to 31st December, 2014. All these cases were operated in the operation theatre of the department of E.N.T; Gauhati Medical College and Hospital in head and neck region with an external suture line. All the cases were subjected to antibiotic coverage up to 14th day of post-operative period to prevent secondary infection of wound. The cases were periodically followed up on 14th, 30th and 90th day after the operation. The condition of the wound was taken into reference and only those cases were taken into study where we have found suture material as a cause of defective wound healing with no other precipitating factors. Culture reports ascertained suture material being the cause of poor wound healing. Those cases where infection, improper and inadequate use of post-operative antibiotics and other factors were found to be the cause of improper wound healing, were not included in the study. For a comparative study between the results of each case, different types of suture material were applied in deeper and superficial layers of wound closure of the cases. The combinations used were- Vicryl/Ethilon, Vicryl/Mersilk, Catgut/Ethilon, Catgut/Mersilk in deeper and superficial layers respectively.

OBSERVATION AND RESULTS: The different cases performed were thyroid surgeries (10) , repair of facial and neck injuries (15) ; excision of cystic lesions of head and neck (16), excision of neoplastic lesions of head and neck (18) ; excision of neck glands (20); ear surgeries (11) , mandible surgeries (6); nasal surgeries (9). Therefore a total of 105 cases were done out of which 25 cases were found to have poor wound healing related to suture material.

Out of these 25 cases that showed poor healing, the suture combinations used in deeper and superficial layers were catgut and mersilk in 10 cases; catgut and ethilon in 8 cases, vicryl and mersilk in 5 cases, vicryl and ethilon in 2 cases. This accounts to 40%, 32%, 20% and 8% respectively.

DISCUSSION: Henceforth we have seen that the selection of a suitable suture material is of utmost importance. The following literature will help us in better understanding of a suture material.
CHARACTERISTICS OF AN IDEAL SUTURE:

- Several parameters, such as tensile strength, breaking strength, elasticity, capillarity and memory are used to describe physical characteristic of sutures.[1]
- It should excite least tissue reaction and should not create a situation favourable for bacterial growth.
- It should be non-capillary, non-allergic, non-electrolytic and non-carcinogenic.
- It should produce knots which hold securely without cutting and fraying.
- It should be easily sterilised without alteration of the physio-chemical properties.
- It should not be expensive.

CLASSIFICATION OF SUTURES:[2] Suture materials can be broadly classified as naturally occurring and synthetic.[3]

A. ABSORBABLES: Natural- surgical gut (plain and chromic), collagen, fascia lata, cargile membrane, kangaroo tendon.
   Synthetic- polyglactin (Vicryl), polydioxonone (PDS), polyglycolic acid (Dexon-s).

B. NON-ABSORBABLES: Natural: silk, cotton, linen, silkworm gut.
   Synthetic-polyamide (poly or monofilament-braided), polyester (coated or uncoated), polypropylene (Monofilament).
   Metal-tantalam, stainless steel (Mono or polyfilament).

RAW MATERIAL AND TENSILE STRENGTH (LOSS-IN VIVO) OF SUTURE:

A. ABSORBABLE SUTURE:

- CATGUT: Collagen from cow or sheep intestinal mucosa. Strength lost in 7-10 days. Rapid loss in presence of infection. Moderate tissue reaction. Derived from animal protein, they are degraded through the digestive action of proteolytic enzymes produced by inflammatory cells.[4]
- CHROMIC CATGUT: Catgut treated with 20%chromic acid to resist digestion. Maintain strength for 10-14[5] days. Starts losing strength in 18-21 days. Tissue reaction is less than catgut.
- POLYGLACTIN (VICRYL): Copolymer of lactide and glycolide. 40% loss in two weeks. 70% by three weeks. Mild tissue reaction.
- POLYDIOXONONE (PDS): Polyester polymer. Prolonged absorption. 30%, 50% and 75% loss at 2, 4 and 6 weeks respectively. Slight tissue reaction.
- POLYGLYCOLIC ACID (DEXON-S): Glycolic acid polymer. 45% lost by 3 weeks. Mild tissue reaction.

B. NON-ABSORBABLE SUTURE:

- COTTON: Long staple cotton fibres. 50% lost by 6 months. 70% lost by 2 years. Minimal tissue reaction.
- NYLON (ETHILON): Polyamide polymer. 15-25% loss per year. Extremely low tissue reaction.
ORIGINAl ARticLe

- **POLYPROPYLENE**: Propylene polymer. Indefinite strength. Minimal tissue reaction.
- **POLYETHYLENE TEREPHTHALATE**: Indefinite tensile strength. Has minimal tissue reaction.

**IDEAL SUTURE MATERIAL FOR SKIN CLOSURE:**

A. **DEEP (Dermal or buried): ABSORBABLE:**
   - Polyglactin 910 (vicryl).
   - Surgical Gut (catgut).
   - Polyglycolic acid (dexon).
   - Polylactide (monocryl).

B. **SUPERFICIAL: MONOFILAMENT NON-ABSORBABLE:**
   - Nylon (ethilon).
   - Polypropylene (prolene).

**SUTURE INDICATION BY LOCATION:**

- Scalp: Superficial non-absorbable suture 4-0 or 5-0, deep absorbable suture 3-0 or 4-0.
- Face, eyebrow, nose, lip: Superficial 6-0, deep 5-0.
- Ear, eyelid: Superficial non-absorbable suture 6-0.

**SUTURE REMOVAL TIMING:**

- Scalp: 6-8 days.
- Face, eyelid, eyebrow, nose, lip: 3-5 days.
- Ear: 10-14 days.
- Conditions delaying wound healing, like diabetes mellitus, chronic corticosteroid use: 14-21 days.

**CONCLUSION**: Our study reveals 23.8% exhibiting poor wound healing as a result of use of suture material alone. Maximum cases of bad healing were seen due to use of Catgut and Mersilk in deeper and superficial layer amounting to 40%. Vicryl in deeper layers and Ethilon in superficial layer appeared to be the best combination amounting to only 8% of bad healing due to minimal tissue reaction.

**REFERENCES:**

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| FINANCIAL OR OTHER COMPETING INTERESTS: | Date of Acceptance: 06/06/2015. |
|----------------------------------------| Date of Publishing: 12/06/2015. |