

Importance of Surgical Wound Healing and Care

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Abstract

Background: The surgical wound complications are one of the major global causes of morbidity after the surgery.

Aim: To analyze the surgical wound complication and to discuss direct and indirect parameters which affects surgical wound healing and care.

Material and Methods: Reports on surgical wound complication has been selected. Selected literatures are as shown in references. There is considerable research conducted and reported for surgical site infection. We include literatures for all types of surgical site complication.

Results: Majority of the surgery patients feel that surgery is wound on skin. They are more sensitive about wound on skin. Though surgery site complication is preventable, curable and treatable but global survey reports show need of more research and safe surgical procedure.

Conclusions: There is special care of surgical wound at almost all the hospital. But even after there is a problem because of considerable gaps in our knowledge, by and large awareness about SSI.

Keywords: Wound Healing and Care; Surgical Site Infection; Safe Surgical Procedure Direct and Indirect Parameters

Introduction

Wound healing is normal biological process in human body. The skin is the largest organ of human body. Normal patient does not know details of the surgical operation, He/She can see and feel the wound at surgical site. There should be good coordination between nursing team and treating surgical team, which is essential for management of surgical wound, healing of surgical wound faster than other kind of wound, a large or/and deep cut heals faster, health care provider sutures it.

Blood supply is one of the most important factors in wound healing. It needs twice blood to heal, so blood quality, quantity and circulation are very important factor to heal wound. Hypertension, diabetes, obesity, and vascular disease are conditions which affect quality of the blood and hence slower or not at all the wounds heal.

There are two types of factor effects wound healing process.

Local (B) General (CHART-1)

No Suture method is ideal for every wound. The main purpose includes distribution of tension to deeper layers, eversion of wound margin and traumatic handling of tissues.

Discussion

Wound healing process:

Regardless of the wound closure method healing occurs through four phases [1-11]

- **Hemostasis:** Platelet aggregation, degranulation, fibrin for motion and vascular construction

- **Inflammatory phase:** Neutrophil infiltration, monocyte infiltration, neutrophil infiltration, differentiation to macrophage.
- Proliferative phase, ECM formation, collagen synthesis angiogenesis, re-epithelialization
- Tissue remodeling - Vascular maturation and regression.

These phases are highly integrated and overlapping in nature. Role of stem cell in cutaneous wound healing is subject of research.

Some important points for the surgery patient:

- Until incision is healed completely don't use swimming pool and hot tubes.
- For clean open wound, don't use hydrogen peroxide, rubbing alcohol or iodine.
- If the hair roots are damaged, may not have scar tissue. which do not grow any hair?
- When discharges from hospital, ask nursing staff how to clean and care for surgical wound.
- Remove dressing before showering.
- Discuss medical history with surgical team before surgery.
- Don't save the skin at surgical site.
- Call doctor if anything abnormal.
- Inform medicines that have taken as a routine please, inform the doctor.
- Get name of the person responsible for overseeing ongoing care.
- Get detail written information about received and ongoing care.
- Minimize the movement that involves wound.
- Take shower or bath before surgery
- Delayed healing of surgical wound may be due to lifestyle. Change the lifestyle before and after the surgery
- Follow the manufacturer's instructions when using a wound cleansing solution and materials.
- Wear comfortable cloth
- Control blood sugars through exercise, diet, yoga, and meditation.

Diabetes

Surgically created wound can become chronic if it is infected. Diabetes may affect the blood flow and move slowly. It means oxygen and other nutrients delivery become insufficient at surgical wound where if need badly. This results wound healing process become slower or may not heal at all. This problem become more serious when we consider about 11.3% of population of USA have diabetes. Blood glucose can also damage nerves, patient might not be aware about condition at his/her surgical wound. Diabetes prevents your immune system from functioning efficiently. So increases inflammation in the body's cells.

Neuropathy

Peripheral neuropathy cause blood sugar level higher. Over time, damage occurs to the nerves and vessels results in losing sensation. Patients may not be knowing about pain or infection. If infection is untreated, it can spread, lead to complication such as gangrene or sepsis.

Modern emergency Surgery under exposure of the electromagnetic radiation of high frequency. Radiation causes both acute and delayed effects on tissue. The main effect of radiation are the results of impaired fibroblast function and to impaired collagen production [2]. Boroditsky and colleagues found a relation between radiation dose and a reduction in wound strength. Limited movement around the stitches is advisable. Avoid activities that could cause your incision improves healing.

Though the surgery may require radiological reports and assessment, even after the surgery, effect of radiation must be considered in wound healing process.

Nutrition deficiency

In normal life, we are not aware about nutrition balance. For normal wound healing, Patient needs carbohydrates, protein, amino acids, fatty acids, mineral, vitamins, and sufficient water. Sometimes, inadequate absorption of nutrients creates problem in wound healing.

Drug effect and side effect can also decrease healing process. Deficiency of vitamin c also creates adverse effect on healing process. Deficiency of fatty acid is common and related with poor

wound healing. Zinc deficiency arises in patient, result in poor wound healing.

Other than this, there are many more parameters could affect would healing process are.

Smoking

It has been known that smoking effects negatively on rate and quality on wound healing process [3]. Smoking decreases patient's immunity and hence can delay healing process and increases risk of infection and scarring of the surgical wound site. "There are advantages to postponing minor or non-emergency surgery to give patient's opportunity to quit smoking, resulting better health outcome, said Dr. Vinayaj Prasad, HOD (No Tobacco) WHO. Nicotine enhances platelet adhesiveness, increases the risk of thrombotic micro vascular occlusion and tissue ischemia [4]. Research show that a higher rate of wound infection in the wound infected compare to 2% of wounds in non-smoking group [5]. Smoking is related life style and if can be changed but in the case of emergency surgery may not have time.

Alcohol consumption

Research shows that exposure to alcohol lessens wound healing and increase the incidence of infection [6]. Half of the all-emergency room trauma cases involve alcohol exposure [7,8].

Exposure to ethanol seems to influence the infection the proliferative phase of healing [7]. All clinical data regarding this topic shows that chronic alcohol exposure cause receptivity to infections. Connective tissue restoration is affected by acute ethanol exposure with decreases collagen production and changes in protease hence at surgical the wound site [7-9].

It is very difficult to get information about patient's alcoholism when emergency surgery history taking procedure going on. Patient centered approach continuous wound assessment and/or supervision are vital in surgical wound healing process.

It is vital that extrinsic and intrinsic factor are considered in assessment. Patient should supervise at all stages of wound healing process but initial surgical wound healing process but all stages of wound healing assessment, timing is key. In the just after the surgery signs of intimation are normal. After few days (5 day), Specialist can identify SWCs.

Finally, when judging patient with risk factor intercessions are implemented and information-knowledge is to be provided at the time of discharge.

Early identification of non-healing or late healing of surgical wound risk

"Prevention is better than cure". Early identification of those at risk of surgical wound complication is important for prevention. History is very important to identify for those swc risk. There are various models to find patient's level of swc risk. Majorities of models are associated with surgical site infection. A multidisciplinary approach is required to ensure all possible complication. The patient's surgical journey is accounted to assess for possibility of SWCs. It patient's clinical history indicate that may possible complication in surgical wound healing, Precautionary steps must be taken.

Diagram 1

It is also dependent on types of surgical wound. There are four types of surgical wound as Classified by CDCP.

- **Type A:** It there is no sign of infection or inflammation, wound is considered clean.
- **Type B:** These are the clean wound but at the risk of becoming infected because of its location.
- **Type C:** There are the wound which are in contact with outside object which increase the risk of infection.
- **Type D:** These are dirty-contaminated wound.

The most common complications of surgical wound are infections and wound dehiscence. The other type of complications is related to defect in the normal tissue response to surgical incision and to poor treatment of wound. Ageing is also responsible

in dysfunctional molecular mechanisms. In this case reduces ability to repair damaged cell and issues. It may lead to neo plastic transformation at a normal cell.

	Type	Symptoms	Causes
A	Surgical site infection An infection within 30 days of surgical procedure	Localized swelling, redness, pain heat, tenderness	It causes by bacteria staphylococcus, strep to coccus and pseudomonas, may be due to various from of contact
B	Scarring Scarring of skin from burns or surgery Long time effect surgery	A mote is cluster of colls-bround, black or white	It is part of body healing process. Collagen fibers repairs.
C	Hyper granulation Excess of granulation tissue mass goes beyond the height of surface of the wound.	The rises above the surface are red to dark red, shiny, and soft.	The exact cause is unknown. Negative pressure suction and cellular imbalance.
D	Surgical wound dehiscence Breakdown of opposed or saturated margins	Separation of margin of closed wound. Failure of proper healing	Excessive exposure to moisture for long time Tight adhesive Gehitic disorder.
E	Peri-Wound maceration Damage to surrounding skin of wound or incision	Lighter in color Soft, wet, or soggy Slow wound healing.	Infection of the wound. Weak tissue Incorrect suture Injury of site

Table 1: Major surgical wound complication.

Conclusion

Knowledge about surgical wound healing process is expanding. We could have new therapies for slow or abnormally healing wound in near future. The history of patients and preoperative predictions about surgical wound are major and important point to be noted. For Non healing wound, immunological and genetics assessment are also to be considered. The total environment around surgical wound is also important and it must be treated accordingly. Every surgical procedure must be undertaken with all above points to optimum conditions for healing.

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Finally, when judging patient with risk factor intercessions are implemented and information -knowledge to be provides at the time of discharge.

Chart 1: Wound healing parameters [11].

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