Surgical Wound Infection Surveillance and Antimicrobial Prophylaxis

Essay

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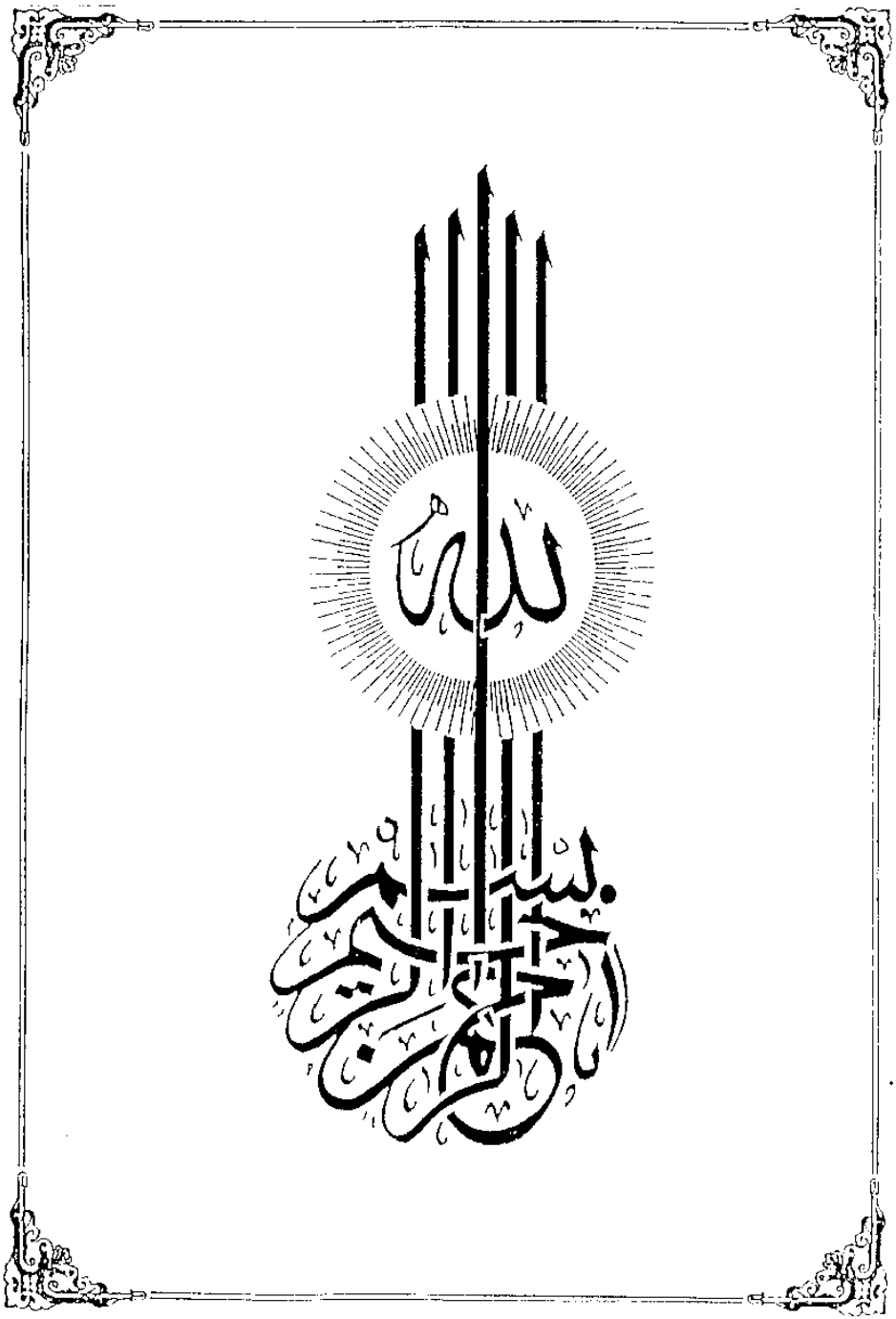

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Introduction:

Nosocomial infection in the form of surgical wound infection (SWI) could occur in 18% of patients admitted to hospital all over the world. These cases have a mortality rate of 2% of hospitally infected case ***(Gardener and Causy, 1983).***

Many workers have ~~been~~ reflected the cause of surgical wound sepsis mostly to the paramount importance of air borne microbial contamination inside operative theater ***(Walter et al., 1987).***

The microbial air content at any time is dependent on a variety of factors, the most important of which are the number of persons present, the amount of their clothing and the ventilation procedure used at different weather conditions ***(Mackie et al., 1989).***

Since the beginning of organized infection control programs, surveillance have been advocated as essential for recognizing nosocomial problems and for developing effective preventing measures. However, there is a number of unresolved issues regarding surgical wound infection surveillance, these include the definition of SWI, case finding methods and stratification of surgeon specific SWI rate ***(Haron et al., 1992).***

The efficiency of prophylactic antibiotics has now been rarefied for hundreds of surgical procedures with a wide variety of antimicrobials when care has

been given to provide adequate serum and tissue levels of antibiotics during surgical procedure. Perioperative antibiotics and aseptic techniques have become routine aspect of care in most major surgical procedures. However, much remain to be learned regarding the pathophysiology and epidemiology of surgical wound infections, the value of increasingly stringent method of asepsis and the optimal choice, dose, and duration of perioperative antibiotics ***(Yu et al., 1986).***

Aim of the Work:

The aim of this study is to spot light on the procedures implemented for surveillance of nosocomial wound infection, appropriate management of surgical patients and techniques of reduction of wound infection rate including the use of prophylactic perioperative antibiotics.

Historic Review

The study of hospital acquired infection is a new discipline in the science of medicine, although there has been interest, started since the 1st century. Lister, the father of modern surgery integrated a comprehensive hypothesis on how wounds become infected ***(Wenzel, 1987).***

It was only a decade later a true appreciation of the role of air borne bacteria in surgical wound infection became clear ***(La Force, 1987).***

Since early 19th century voices of alarm began to be raised in England. One of the first studies was performed by James Young Simpson at the university of Edinburg, as he noticed an increased rate of infection among hospitalized patients and suggested that something related to hospital care conferred particular risks ***(Major, 1981).***

However, antibiotics provided surgeons with a powerful armamentarium but its use is a double weapon and should be used cautiously and their availability should never induce a sense of complacency about infection and its consequences ***(Kitchner and Kingdom, 1990).***

In 1995, Mandell and his colleagues stated that since sepsis remain problem following surgery, detailed attention must be directed to risk factors for

SWI as well as to surgical techniques and theater discipline. In addition they implemented understanding of pathogenesis of wound infection and the ability to think in surgical manner about the post operative wound sepsis which would help toward a rational management plan ***(Mandell et al., 1995).***

Definition of Surgical Wound Infection (SWI)

The purpose of surveillance definition of SWI is to provide simple, unambiguous criteria that can be consistently applied by different observers. Definition of nosocomial infections including SWIs are not intended for defining clinical disease, initiating treatment or providing standers for reimbursement. The centers for disease control (CDC) definition of SWIs are the most commonly used definition in the United States *(Larson et al., 1988 & 1989).*

Selected CDC surveillance definition of nosocomial SWI:

A-Incisional infection must occur at the incision site within 30 days after surgery and involve skin, subcutaneous tissue, or muscles located above the fascial layer and any of the following:

1-Purulent drainage from the incison or drain located above the fascial layer.

2-Organism isolated from culture of fluid from wound closed primarily.

3-Surgeon deliberately open wound, unless wound is culture negative.

4-Surgeon's or attending physician's diagnosis of infection.

B-Deep surgical wound infection must occur at the operative site within 30 days after surgery if no

implant is left in place or within 1 year if implant is in place and infection involves tissues or spaces and any of the following:

1-Purulent drainage from drain placed beneath fascial layer.

2-Wound spontaneously dehisces or is deliberately opened by surgeon when patient has fever > 38°C and/or localized pain or tenderness, unless wound culture is negative.

3-An abscess or other evidences of infection seen on direct examination, during surgery, or by histopathologic examination.

4-Surgeon's diagnosis of infection. ***(Gorbach et al., 1995).***

Standardizing the definitions used will improve the accuracy of SWI surveillance. This consideration is becoming increasingly important because infection rate may be used as measure of quality.

A single definition of SWI was recommended to be adopted by all United States hospitals and discourage its modification. Because the CDC definition has been used widely and is easy to learn and apply. The Society for Hospital Epidemiology of America (SHEA), Association for Practitioners in Infection Control (APIC), National Nosocomial Infection Surveillance (NNIS), and the Surgical Infection Society (SIS) collaborated with the CDC to clarify area of SWI ***(Haron et al., 1992).***

There are two major changes in the CDC definition; changes in the terminology which include substitution of surgical site for surgical wound to help clarify the location of infections associated with surgical procedures and a clarification of the specific anatomical location of the deep infections ***(Haron et al., 1992).***

SWI are divided into incisional SWI and organ/space SWI. Incisional SWI are further classified into those involving only the skin and subcutaneous tissue called superficial incisional SWI and those involving deep soft tissue of the incision called deep incisional SWI e.g., facial and muscle layers. Organ/space SWI involve any part of the anatomy e.g., organs or spaces, other than incision, opened or manipulated during the operative procedure ***(Nosocomial infection rates for interhospital comparison, 1991).***

Class I superficial incision SWI:

Superficial incision SWI must meet the following criteria:

-The infection occur within 30 days after the operative procedure and involve only skin or subcutaneous tissue of the incision. In addition to one of the following:

1-Purulent drainage from the superficial incision,

2-Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision,

3-Signs or symptoms of infection e.g., pain or tenderness , localized swelling, redness or heat, and
4-The superficial incision deliberately opened by surgeon unless the incision is cultured negative,
5-Diagnosis of superficial SWI by the surgeon or attending physician ***(Nosocomial infection rates for interhospital comparison, 1991).***

The following are not reported as superficial SWI:

1-Stitch abscess (minimal inflammation and discharge confined to the points of suture penetration).
2-Infection of an episiotomy or newborn circumcision site (episiotomy or newborn circumcision are not considered by NNIS system as operative procedures).
3-Infected burn wound, and incisional SWI that extend into the facial and muscle layer ***(The Society for Hospital Epidemiology of America, 1992).***

Class II deep incisional SWI: must meet the following criteria:

-The infection occur within 30 days after the operative procedure if no implant (i.e., non-human derived implantable foreign body), e.g., hip prothesis or within one year if an implant is in place and the infection appears to be related to the operative procedure. The infection involve deep soft tissue of the incision. In addition, at least one of the following:
1-A purulent drainage from deep incision but not from organ or space component of surgical site.
2-A deep incision that spontaneously dehisces, or

3-An incision is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms fever more than 38°C localized pain or tenderness, unless the incision is culture negative.
4-An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
5-Diagnosis of a deep incisional SWI by a surgeon or attending physician ***(The Society of Hospital Epidemiology of America, 1992).***

Class III: organ/ space SWI

It involves any part of the anatomy (organ or space): other than the incision, opened or manipulated during the operative procedure, specific sites are assigned to organ/space SWI to further identify the location of the infection. An example is appendectomy with subsequent subdiaphragmatic abscess, which would be reported as an organ/space SWI at the intraabdominal specific site.

Organ/space SWI must meet the following criteria:

-The infection occurs within 30 days after operative procedure if no implant is left in place or within 1 year if implant is in place, -the infection appear to be related to the operative procedure, -the infection involve any parts of the anatomy (organ or space) other than the incision, opened or manipulated