

## Professor Rajagopalan S: Surgical Site Infections–Tackling the Menace



### INTRODUCTION

Surgical site infections (SSIs) are one of the most common health care associated infections in patients undergoing a surgical procedure and one which every surgeon deals with in day-to-day practice. In the pre-Listerian era, surgeons grappled with large numbers of foul smelling wounds dripping with pus, and gangrenous limbs, clueless as to the exact etiology and causative organism.

Ignaz Philipp Semmelweis fought unjustifiable prejudices of his colleagues and introduced handwashing and antiseptics in obstetric patients, while Joseph Lister did much further for the knowledge of asepsis and antisepsis in his surgical practice. There is burgeoning literature in the past two decades about the causative factors, microbiological agents, and preventive guidelines about infections in general and SSIs in particular.

### DEFINITION AND PREVALENCE

The US Center for Disease Control defines SSI as an “infection that occurs after surgery in the part of the body where the surgery took place, within 30 days or within 1 year of an implant placement.” It is often superficial involving only the skin, but can sometimes involve tissues under the skin, organs, or implanted materials.<sup>1</sup>

Surgical site infection, being one of the four hospital acquired infections, needs to be highlighted because of the significant impact it has on cost of medical care, duration of hospital stay, attributable mortality, and other complications.<sup>2,3,5</sup> Up to 20% of all health care acquired infections are SSIs depending on the procedure.<sup>4</sup> In India, various studies for SSIs at Pune and Mumbai have shown prevalence of 6 and 8.95% respectively.<sup>6,7</sup>

Surgical wounds heal by primary intention as opposed to trauma wounds which may be allowed to heal by secondary intention. The 1964 US Multimedia Research Group classification of operative wounds as clean, clean-contaminated, contaminated, and dirty still holds good.<sup>8</sup> No uniform system exists for wound assessment but the ASEPSIS score and Southampton wound assessment scale are two of the most commonly used systems. They grade wounds as per numerical criteria and are more objective.<sup>9,10</sup> Wound infection rates vary as per the type of wounds.<sup>11</sup>

### RISK FACTORS FOR SURGICAL SITE INFECTIONS

Many risk factors influence wound healing and increase the potential for bacterial infection of surgical patients. They may be grouped under:

- Patient related factors
- Procedure related factors.

#### Patient Related Factors

- Older age
- Preexisting infection
- Smoking
- Diabetes mellitus
- Immunosuppression
- Obesity.

#### Procedure Related Factors

- Poor surgical technique
- Duration of surgery
- Preoperative skin preparation
- Sterility of equipment

- Types and techniques of anesthesia
- Sterility and traffic in operation theater

Although all surgical wounds tend to be contaminated by bacteria, only some of them tend to get infected as determined by the following four factors<sup>12</sup>:

1. Quantity of bacterial inoculums in the wound
2. Virulence of the contaminants
3. Quality of patient's defense mechanism
4. Wound environment—suture type, presence of clot/contaminants/pus/debris, etc.

## PREVENTION OF SURGICAL SITE INFECTIONS

World Health Organization and Centers for Disease Control and Prevention have established guidelines to prevent SSIs. They are grouped under preoperative, intraoperative, and postoperative guidelines.<sup>13</sup>

### Preoperative Prophylaxis

- Surgical hand asepsis of health care workers—trim nails, remove jewellery, preoperative hand scrub for 2 to 5 minutes.
- Surgeon and assistants don sterile gown, cap, and masks.<sup>13</sup>
- Preoperative skin preparation—treatment of patient's skin infection if any, prior patient shower.<sup>14</sup>
- Patient's skin preparation with antiseptics—hair clipping recommended, not shaving.
- Appropriate prophylactic antibiotic intravenously about an hour before incision.<sup>15,16</sup>
- Blood glucose control.<sup>17</sup>

### Intraoperative Prophylaxis

- Adequate traffic control in operation theater—avoid unnecessary and unauthorized personnel entry.<sup>18</sup>
- Maintain normothermia during general anesthesia, especially in pediatric and geriatric patients.
- Clean and gentle technique of tissue handling, avoid drains.
- Irrigate wounds and cavities prior to wound closure to remove clots/debris/contaminants.

### Postoperative Prophylaxis

- Postoperative wound care—timely and appropriate dressings with antiseptics if necessary,<sup>19</sup> wash hands before and after dressings and use sterile precautions.<sup>13</sup>
- Avoid hyperglycemia.<sup>20</sup>

## CONCLUSION

Despite all-round improvement in wound care strategy, SSI continues to be a problem associated with considerable morbidity and mortality, besides increasing health care expenditure. A concerted effort by health care workers, hospital management, and patients are required to tackle this menace.

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