Chapter 7

Summary and Conclusion

Postoperative wound infections continue to remain an important problem, despite recent medical and surgical developments. Many placebo controlled trials have demonstrated that antimicrobial prophylaxis complements meticulous surgical technique in reducing the incidence of wound infection. Surgical site infections have still been the second most common cause of nosocomial infections. Surgical prophylaxis is a short-term antibiotic usage directed to possible agents before, during or immediately after contact. For optimal prophylaxis, an antibiotic with a targeted spectrum should be administered at sufficiently high concentrations in serum, tissue, and surgical wound during the whole time that the incision is open and at risk of bacterial contamination.

A major effect of antibiotic prophylaxis is reduction in the incidence of surgical infections, the number of hospital days, the use of antibiotics for therapeutic purposes, and the sepsis-related mortality rate. Inappropriate use of surgical antimicrobial prophylaxis, in terms of prolonged duration and use of broad-spectrum antibiotics, can select for resistant microorganisms and leads to high costs, while incorrect timing reduces its efficacy. Many surveillance and intervention studies have been performed on the quality of prophylaxis. The lack of consensus on use of antimicrobials led us to carry out a study to detect the routine surgical practice in our institution about the concordance with the international guidelines, and to arrange and evaluate an educational intervention to adjust inappropriate use.

The first part of this study was carried out in the various departments of RMMCH to identify the most prevalent pathogens and their sensitivity pattern against antimicrobials. The data were collected from a total of 336 samples. The department wise prevalence of pathogens was determined. The obtained data were analysed for sensitivity and resistance pattern of isolated pathogens. Staphylococcus aureus and Pseudomonas aeruginosa were found to be more prevalent than other organisms. Prevalence of Pathogens in surgery department was higher compared to all other departments. The isolated pathogens were found to be highly sensitive to Amikacin and Cefotaxime.
The second part of the work was carried out in the surgery department of RMMCH. Totally 341 surgeries were carried out during the study period. The data was analysed to assess the most prevalent organisms and their sensitivity and resistance pattern. Post operative wound infections in gastrointestinal surgeries were higher compared to all other surgeries. The sensitivity and resistance pattern of isolated pathogens was similar to that of the first study.

The third part of the study was carried out between September, 2012 to Feb, 2013. The data was collected from 630 patients undergone gastrointestinal surgery and analysed to assess the prophylaxis treatment pattern, empirical treatment pattern and other risk factors for post operative wound infections. The sensitivity and resistance pattern of isolated pathogens against the empirical treatment was traced. The cost per course of the treatment was compared. Among all antimicrobials, Cefotaxime with Metronidazole was found to be appropriate for prophylaxis treatment with lowest cost. The infection was highly dependent on antimicrobial prophylaxis administration time. Combination of Cefotaxime with Gentamycin and Metronidazole was found to be appropriate empirical treatment with lowest cost per course of treatment. Smoking, alcohol abuse and comorbid condition were found to be significant predictors of the primary outcome consisting of wound-related complications and mortality.

The final validity study was carried out between May, 2013 to Feb, 2014 in the surgery department to assess the validity of the inputs of previous study. Guidelines were developed based on previous findings. The guidelines were distributed among all the concerned and the patients were educated through counseling. To assess the impact of guidelines the data was collected from a total of 580 patients. A significant reduction in infection rate and improved appropriate use of antimicrobials was observed between the baseline and intervention study. The Containment of rising inpatient antimicrobial use is possible with guideline dissemination and patient education.

This study revealed that the public had limited awareness of infection, antibiotics and resistance and wanted quick relief through antibiotics. The level of antibiotic use is significant in the community, especially in post operative wound infections. Patterns of antibiotic use varied among various departments. Knowledge and understanding of
resistance was limited. Antibiotic resistance had significant impact on cost and health consequences in patients. Containment of rising inpatient antibiotic use was possible with guideline dissemination through intranet computer network. Improving public awareness, provider communication, diagnostic support, and strict regulatory implementation were suggested strategies.

This educational intervention study achieved improvements in use of antimicrobials (Antimicrobial prophylaxis, empirical treatment, correct choice of antibiotics, correct dosing and time of administration), this has also resulted in decrease in infection rates, decrease in average cost of prophylactic and curative treatment. However it could not achieve complete compliance of agreed / approved guidelines by all the surgeons.

A single interventional study though somewhat useful in improving the use of antimicrobials, a more strategic attempt with systematically designed antimicrobial use guidelines and parallel sensitization cum education programme would be more effective in changing the antimicrobial use practice in health facilities.
Limitation of the study

The study was conducted in one hospital (Rajah Muthiah Medical College Hospital, a 1400 bedded multi-specialty tertiary care teaching hospital attached to Annamalai University) and the result reflects the outcome of intervention carried out in this hospital. The intervention is highly specific and is dependent on several factors like orders from the authorities, availability of appropriate guidelines and medicines. The present work is just an attempt by the researcher to pursue adopting evidence based choice and use of antimicrobials after surgery. The outcome of the similar studies may not be same in other hospitals.

Future scope of the study

In spite of sophisticated surgical techniques, use of sterile operating theatres and antimicrobial prophylaxis, postoperative wound infections continue to be the challenging task in surgical care. Inappropriate choice of antimicrobials for surgical prophylaxis often coupled with wrong dose and duration is one of the causative factors. Inappropriate use not only responsible for causing post surgical wound infection but also causing much damage through development of antimicrobial resistance. It has been advocated to develop strategies to improve the use of antimicrobials which may slow down the process of antimicrobial resistance development. The national guidelines as well as international guidelines recommend the hospital specific intervention programme and auditing of antimicrobial use. Hence, it may be concluded that research like drug utilization studies for antimicrobials should be a continuing process in order to assess the current use practices and designing intervention for improving the use.