Pattern of Antibiotic Therapy & Effectiveness in GI surgeries

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Introduction

Surgical site infections are one of the most common healthcare-associated infections in patients undergoing surgeries and remains a major source of post-operative morbidity. Antibiotics are among the most widely prescribed drugs in hospitals, almost a third of all hospitalized patients receive at least one antibiotic.

Prevention and management of infections is vital as post-operative surgical site infections (SSI) alone can prolong hospitalization, double re-admission rates, triple the cost of treatment, even cause severe morbidity and mortality. Patients who experience SSIs are 60% more likely to be admitted in Intensive Care Unit (ICU), five times more likely for re-admission and twice as likely to expire compared to patients who do not contract SSIs. Encouraging surgeons to adopt a more liberal approach toward prescribing antibiotics. Which, in practice may seem beneficial in reducing infection rates, but can potentially lead to emergence of more resistant microorganisms. Resulting in deterioration of patients condition as well as increasing health-care cost.

Prescribing appropriate antibiotics for the purpose of prophylaxis as well as post-operative purpose is of great importance in ensuring improved quality of care, infection control as well as prevention of multi-resistant organisms. Numerous studies have been conducted in developed countries on the pattern of antibiotic usage but few studies have measured the appropriateness of antibiotic use among surgical patients, particularly in developing countries. Our study focusses on the pattern of antibiotic use in various gastro-intestinal surgical procedures and measures their effectiveness in practice by comparison against current ASHP guidelines.

Methodology

This cross-sectional retrospective observational study was conducted on 652 patients who underwent various surgical procedures in Gastroenterology department at a quaternary care hospital in India. The study was conducted for a period of one year from January 2015 - December 2015. Data was collected from patient case files and appropriateness of antibiotic therapy was based on compliance with ASHP guidelines. Further statistical analysis was performed using Microsoft Excel.

Results

Demographic details

No of patients: 652 **Male:** 387 **Female:** 265 **Mean age:** 49.56

Figure: 1 Age group admitted for various surgical procedures

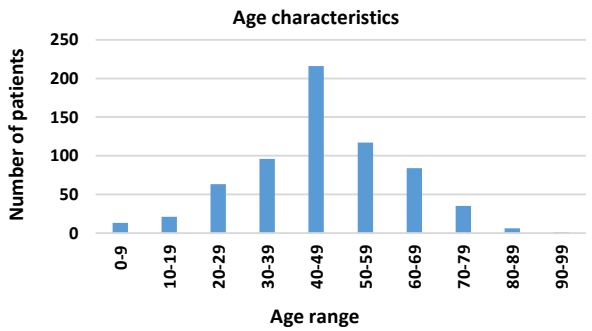

Table: 1 Suggested antibiotics as per ASHP

Procedures	1st Line	2nd Line
Appendectomy	Cefoxitin, cefotetan, cefazolin + metronidazole	Clindamycin + aminoglycoside or aztreonam or fluoroquinolone
Gastro-duodenale procedures	Cefazolin	Clindamycin or vancomycin + aminoglycoside or aztreonam or fluoroquinolone
Laparoscopic procedures	Cefazolin, cefoxitin, cefotetan, ceftriaxone, ampicillin / sulbactam	Clindamycin or vancomycin + aminoglycoside or aztreonam or fluoroquinolone
Small intestine obstruction removal	Cefazolin + metronidazole, cefoxitin, cefotetan	Metronidazole + aminoglycoside or fluoroquinolone
Hernia repair	Cefazolin	Clindamycin, vancomycin
Colorectal procedures	Cefazolin + metronidazole, cefoxitin, cefotetan, ampicillin / sulbactam, ceftriaxone + metronidazole, ertapenem	Clindamycin + aminoglycoside or aztreonam or fluoroquinolone + metronidazole + aminoglycoside or fluoroquinolone
Cancer surgeries	Cefazolin + metronidazole, cefuroxime + metronidazole, ampicillin / sulbactam	Clindamycin
Hepatic surgeries	Piperacillin / tazobactam, cefotaxime + ampicillin	Clindamycin or vancomycin + aminoglycoside or aztreonam or fluoroquinolone

Table: 2 Antibiotics prescribed in practice

Procedures	Antibiotics prescribed
Appendectomy	Amoxicillin / Clavulanate ± Metronidazole or Piperacillin / Tazobactam
Gastro-duodenale procedures:	
Clean surgery:	Amoxicillin/Clavulanate
Pancreatitis:	Cefoperazone Sodium
Severe pancreatitis:	Meropenam ± Polymyxin E
Laparoscopic procedures	Amoxicillin / Clavulanate
Small intestine obstruction removal	Piperacillin / Tazobactam ± Metronidazole
Hernia repair	Amoxicillin / Clavulanate
Colorectal procedures	Amoxicillin / Clavulanate
Cancer surgeries	Amoxicillin / Clavulanate or Piperacillin / Tazobactam
Hepatic surgeries	Piperacillin / Tazobactam ± Metronidazole
Others	Amoxicillin / Clavulanate or Piperacillin / Tazobactam or Cefoperazone Sodium

Figure: 2 Effectiveness of antibiotics therapy

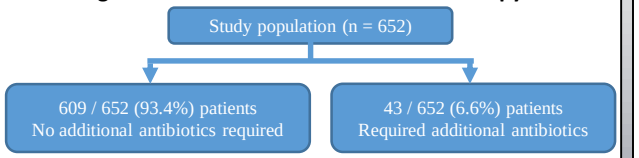

Table: 3 Various Surgical procedures performed

Procedures	Number
Appendectomy	45
Gastro-duodenale procedures	141
Laparoscopic procedures	104
Small intestine obstruction removal	23
Hernia repair	86
Colorectal procedures	150
Cancer surgeries	38
Hepatic surgeries	31
Others	33

Discussion

Our study consisted of 652 patients, of which 387 were Male and 265 were Female, with a mean age of 49.56 years. Patients under went the following surgical procedures appendectomy (45, 6.90%), gastro-duodenale procedures (141, 21.66%), laparoscopic procedures (104, 15.97%), small intestine obstruction removal (23, 3.53%), hernia repair (86, 13.21%), colorectal procedures (150, 23.04%), cancer surgery (38, 5.84%), hepatic surgeries (31, 4.75%) and other (33, 5.10%). Analysis for the appropriateness as well as effectiveness of prescribed antibiotics was compared to the current American Society of Health-System Pharmacists (ASHP) guidelines for antimicrobial prophylaxis in surgery.

Evaluation of effectiveness of antibiotics in prescribed therapy indicated 93.4% of population received appropriate therapy and 6.6% required additional antibiotics. This may be due to difference in patient characteristics or even due to the presence of resistant microorganisms. Our study found ASHP therapeutic guidelines were not followed by the variation in antibiotic regimens employed for both therapeutic as well as prophylactic purposes.

Conclusion

The lack of compliance with ASHP guidelines was clearly evident which maybe for several reasons. Although the guidelines were disseminated to hospitals; the actual awareness of information within hospital was less than satisfactory. There was also a lack of audit system for the antibiotic usage which could also contribute to lack of compliance. Many doctors were not aware these guidelines existed which demands for greater involvement of practicing doctor in deciding more hospital specific policy on antibiotics.

Future Research

- Conduct similar study in various departments where antibiotics are prescribed
- Design an antibiotic policy based upon current health care practice

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