Rational Use of Antibiotics & Surgical Prophylaxis

G K SADAGOBAN
Lecturer
Department of Pharmacy Practice
JSS COLLEGE OF PHARMACY, OOTY

Introduction

- Antibiotics are one of the most commonly prescribed drugs today.
- Rational use of antibiotics is extremely important as injudicious use can adversely affect the patient.
- It cause emergence of antibiotic resistance and increase the cost of health care

Introduction

i) perception of need - is an antibiotic necessary ?

ii) choice of antibiotic - what is the most appropriate antibiotic ?

iii) choice of regimen : what dose, route, frequency and duration are needed ?

iv) monitoring efficacy : is the treatment effective ?

Perception of Need

- Antibiotics are generally only useful for the treatment of bacterial infections.

- The majority of infections seen in general practice are of viral origin and antibiotics can neither treat viral infections nor prevent secondary bacterial infections in these patients.

- Minor superficial skin infections may be more suitably treated with a local antiseptic. Collections of pus should be drained surgically and if drainage is adequate, antibiotics are often not required.

Choice of antibiotic

- The etiological agent
- The patient
- The antibiotic

Choice of regimen

- Parenteral or oral
- Duration of treatment

Choice of regimen

Infection	Minimum duration of treatment
Tuberculosis	4 -6 months
Empyema and lung abscess	4 - 6 weeks
Endocarditis	4 weeks
Osteomyelitis	4 weeks
Atypical pneumonia	2 - 3 weeks
Pneumococcal meningitis	7 days
Pneumococcal pneumonia	5 days

Monitoring efficacy

- Early review of response
- Inconsistent microbiology reports
- Causes of non-response to antibiotics

Guidelines for Surgical Prophylaxis

ASHP Guidelines

- ASHP Guidelines for Surgical Prophylaxis developed jointly by the American Society of Health-System Pharmacists (ASHP)

- Rational, safe, and effective use of antimicrobial agents for the prevention of surgical-site infections.

- Primary prophylaxis refers to the prevention of an initial infection. Secondary prophylaxis refers to the prevention of recurrence or reactivation of a preexisting infection,
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Strength of Evidence and Grading of Recommendations

- Level I (evidence from large, well-conducted, randomized, controlled clinical trials or a meta-analysis)
- Level II (evidence from small, well-conducted, randomized, controlled clinical trials)
- Level III (evidence from well-conducted cohort studies)
- Level IV (evidence from well-conducted case–control studies)
- Level V (evidence from uncontrolled studies that were not well conducted)

Strength of Evidence and Grading of Recommendations

- Level VI (conflicting evidence that tends to favor the recommendation)
- Level VII (expert opinion or data extrapolated from evidence for general principles and other procedures)
- Each recommendation was categorized according to the strength of evidence that supports the use or nonuse of antimicrobial prophylaxis as

- Category A (levels I–III),
- Category B (levels IV–VI)
- Category C (level VII).

Key points & Updates ASHP Guidelines

- *Preoperative-dose timing*

The optimal time for administration of preoperative doses is within 60 minutes before surgical incision

- *Selection and dosing*

Drug selection should be based on the present or history culture results and dosing should be based on the body weight of the patients. e.g. Obese Patients

- *Duration of prophylaxis*

New recommendations for a shortened postoperative course of antimicrobials involving a single dose or continuation for less than 24 hours are provided.

Application of Guidelines to Clinical Practice.

- Recommendations are provided for adult (age 19 years or older) and pediatric (age 1–18 years) patients.
- These guidelines do not specifically address newborn (premature and full-term) infants.
- Guidelines do not address all concerns for patients with renal or hepatic dysfunction.
- The recommendations herein may not be appropriate for use in all clinical situations.
- Decisions to follow these recommendations must be based on the judgment of the clinician and consideration of individual patient circumstances and available resources.

Table 1.

Recommended Doses and Redosing Intervals for Commonly Used Antimicrobials for Surgical Prophylaxis

Antimicrobial	Recommended Dose		Half-life in Adults With Normal Renal Function, hr[19]	Recommended Redosing Interval (From Initiation of Preoperative Dose), hr[c]
	Adults[a]	Pediatrics[b]		
Ampicillin–sulbactam	3 g (ampicillin 2 g/ sulbactam 1 g)	50 mg/kg of the ampicillin component	0.8–1.3	2
Ampicillin	2 g	50 mg/kg	1–1.9	2
Aztreonam	2 g	30 mg/kg	1.3–2.4	4
Cefazolin	2 g, 3 g for pts weighing ≥120 kg	30 mg/kg	1.2–2.2	4
Cefuroxime	1.5 g	50 mg/kg	1–2	4
Cefotaxime	1 g[d]	50 mg/kg	0.9–1.7	3
Cefoxitin	2 g	40 mg/kg	0.7–1.1	2
Cefotetan	2 g	40 mg/kg	2.8–4.6	6
Ceftriaxone	2 g[e]	50–75 mg/kg	5.4–10.9	NA

Table 2.

Recommendations for Surgical Antimicrobial Prophylaxis

Type of Procedure	Recommended Agents[a,b]	Alternative Agents in Patients with β-Lactam Allergy	Strength of Evidence[c]
Cardiac			
Coronary artery bypass	Cefazolin, cefuroxime	Clindamycin,[d] vancomycin[d]	A
Cardiac device insertion procedures (e.g., pacemaker implantation)	Cefazolin, cefuroxime	Clindamycin, vancomycin	A
Ventricular assist devices	Cefazolin, cefuroxime	Clindamycin, vancomycin	C
Thoracic			
Noncardiac procedures, including lobectomy, pneumonectomy, lung resection, and thoracotomy	Cefazolin, ampicillin–sulbactam	Clindamycin,[d] vancomycin[d]	A
Video-assisted thoracoscopic surgery	Cefazolin, ampicillin–sulbactam	Clindamycin,[d] vancomycin[d]	C
Gastroduodenale			
Procedures involving entry into lumen of gastrointestinal tract (bariatric, pancreaticoduodenectomy[f])	Cefazolin	Clindamycin or vancomycin + aminoglycoside[g] or aztreonam or fluoroquinolone[h-j]	A
Procedures without entry into gastrointestinal tract (antireflux, highly selective vagotomy) for high-risk patients	Cefazolin	Clindamycin or vancomycin + aminoglycoside[g] or aztreonam or fluoroquinolone[h-j]	A
Biliary tract			
Open procedure	Cefazolin, cefoxitin, cefotetan, ceftriaxone,[k] ampicillin–sulbactam[h]	Clindamycin or vancomycin + aminoglycoside[g] or aztreonam or fluoroquinolone[h-j] Metronidazole + aminoglycoside[g] or fluoroquinolone[h-j]	A

REFERENCES

- ASHP – Surgical Prophylaxis Guidelines – Read Here
- https://www.ashp.org/-/media/assets/policy-guidelines/docs/therapeutic-guidelines/therapeutic-guidelines-antimicrobial-prophylaxis-surgery.ashx