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Guidelines for the use of prophylactic antibiotics in surgery in Taiwan

Infectious Diseases Society of the Republic of China; Taiwan Surgical Association; Medical Foundation in Memory of Dr. Deh-Lin Cheng; Foundation of Professor Wei-Chuan Hsieh for Infectious Diseases Research and Education; and CY Lee's Research Foundation for Pediatric Infectious Diseases and Vaccines

Two converging factors highlight the need to optimize the use of prophylactic antibiotics in surgery. First, there is an increasing global emergence of antimicrobial resistance. The problem is complex and multi-faceted, but the selective force of overuse of antibiotics plays an important role. The second factor is the transition to the era of managed care requiring both cost containment and quality assurance. Appropriate use of antimicrobial agents for surgical prophylaxis has been shown to reduce the incidence of postoperative infection for a variety of surgical procedures. Several guidelines for prophylactic use of antimicrobial agents are available to guide the indications, timing of administration, choice of drug and duration of prophylaxis. Unfortunately, poor compliance with standard guidelines has been reported. The standard guidelines recommend that prophylaxis is indicated only for clean-contaminated and specific clean surgical procedures where the benefits in preventing a rare infection exceed the risks and costs of prophylaxis. It is essential that antibiotic prophylaxis be initiated in close proximity to the time of the surgical procedure, in order to achieve effective tissue concentrations at the time of incision and throughout the operation. The major exception is cesarean section, in which the first dose of prophylaxis should be delayed until the umbilical cord is clamped to avoid placental transfer of the antibiotic to the fetus. Selection of an antibiotic should consider spectrum of activity and cost-effectiveness. A single dose of antibiotic before the operation is sufficient prophylaxis for most surgical procedures. Theoretically, for longer procedures, re-administration of the drug is indicated at intervals of 1 or 2 times the half-life of the drug. No further benefit is conferred by the administration of additional doses after the patient has left the operating room.

In view of similar problems encountered in the selection of appropriate antibiotics for surgical prophylaxis in hospitals across Taiwan, including inappropriate timing of administration and prolonged use postoperatively, a consensus conference to establish guidelines for the use of prophylactic antibiotics in surgery was held on March 8, 2003. This meeting was held following a symposium on antimicrobial prophylaxis in surgery held in conjunction by the Infectious Disease Society of the Republic of China (IDSROC), Taiwan Surgical Association, the Medical Foundation in Memory of Dr. Deh-Lin Cheng, Foundation of Professor Wei-Chuan Hsieh for Infectious Diseases Research and Education, and CY Lee's Research Foundation for Pediatric Infectious Diseases and Vaccines. Participating parties to this consensus conference included board members of the IDSROC, and experts in the field of infectious diseases and surgery. The aim of this guideline is to provide a national guidance to improve the use of prophylactic antibiotic in surgery and to reduce the cost of antibiotic treatment and emergence of resistant microorganisms in Taiwan.

Recommendations for use of prophylactic antibiotics in surgery by specific site or procedure (for adults only)

Site/procedure	Likely pathogen(s)	Recommended antibiotic(s)	Alternative	Duration
Large skin (clean)	*Staphylococcus aureus* CoNS Streptococci	Nil **or** Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV at IA	1 dose
Oto-naso-larynx procedures				
Head and neck (clean)	*S. aureus* CoNS	Cefazolin 1-2 gm IV at IA	Clindamycin 600 mg IV at IA	< 1 day
Head and neck (clean-contaminated)	*S. aureus* CoNS Streptococci Enteric GNB	Cefazolin 1-2 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2mg/kg IV at IA	< 1 day

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Ear (clean-contaminated)	*S. aureus* Streptococci	Cefazolin 1-2 gm IV at IA	Clindamycin 600 mg IV at IA	< 1 day
Nose and sinus (clean-contaminated)	*S. aureus* Enteric GNB Anaerobes	Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV at IA	< 1 day
Tonsil (clean-contaminated)	*S. aureus* Enteric GNB Anaerobes	Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA	< 1 day
Cardiovascular				
Coronary artery graft bypassing (clean)	*S. aureus* CoNS	Cefazolin 1-2 gm IV at IA then 1 gm Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 2 days
Prosthetic valve (clean)	*S. aureus* CoNS	Cefazolin 1-2 gm IV at IA then 1 gm Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 2 days
Large vessel in abdomen or lower limb (clean)	*S. aureus* CoNS	Cefazolin 1-2 gm IV at IA then 1 gm Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 2 days
Thoracic				
Lung (clean-contaminated) Pulmonary resection (lobectomy and pneumonectomy)	*S. aureus* CoNS Streptococci	Cefazolin 1-2 gm IV at IA then 1 gm Q8H	Vancomycin[a] 1 gm IV **on call to OR** **or** Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA **or** 2GC 1-2 gm	< 2 days
Esophagus (clean-contaminated)	*S. aureus* CoNS Enteric GNB	Cefazolin 1-2 gm IV at IA then 1 gm Q8H	Vancomycin [a] 1 gm IV **on call to OR** **or** Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA **or** 2GC 1-2 gm IV at IA	< 2 days
Orthopedics				
Total hip arthroplasty (clean)	*S. aureus* CoNS	Cefazolin 1 gm IV at IA then 1 gm IV Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 2 days
Total knee arthroplasty (clean)	*S. aureus* CoNS	Cefazolin 1 gm IV at IA then 1 gm IV Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 2 days
Internal fixation for close reduction (clean)	*S. aureus* CoNS	Cefazolin 1 gm IV at IA then 1 gm IV Q8H	Vancomycin[a] 1 gm IV **on call to O**R	< 1 day
Spine (clean)	*S. aureus* CoNS	Cefazolin 1 gm IV at IA then 1 gm IV Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 2 days
Other selective, non-prosthesis bone procedures (clean)	*S. aureus* CoNS	Cefazolin 1 gm IV at IA then 1 gm IV Q8H	Vancomycin[a] 1 gm IV **on call to OR**	< 1 day
Neurosurgery				
Craniotomy (clean)	*S. aureus* CoNS	Cefazolin 1-2 gm IV	Oxacillin 2 gm IV at IA **or** Vancomycin[a] 1 gm IV **on call to OR**	< 1 day
Ventriculo-peritoneal shunting (clean)	*S. aureus* CoNS	Cefazolin 1-2 gm IV	Oxacillin 2 gm IV at IA **or** Vancomycin[a] 1 gm IV **on call to OR**	< 2 days

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Colorectal				
Colorectum (clean-contaminated)	Enteric GNB Anaerobes	**Oral:** Neomycin 1 gm QID + metronidazole 1 gm QID the day before OP **or** Tinidazole 1 gm the night before OP And IV Cefoxitin 1 – 2 gm IV at IA **or** Cefmetazole 1-2 gm IV at IA **or** Cefazolin 1 gm ± gentamicin 2 mg/kg ± metronidazole 500 mg IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA **or** Amoxicillin/clavulanate 750 mg IV at IA **or** Ampicillin/sulbactam 1.5 gm IV at IA	< 1 day
General surgery				
Non-complicated appendectomy (infected)[b]	Enteric GNB Anaerobes	Cefoxitin 1-2 gm IV at IA[b] **or** Cefmetazole 1-2 gm IV at IA[b] **or** Cefazolin 1 gm + gentamicin 2 mg/kg + metronidazole 500 mg IV at IA[b]	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA **or** Amoxicillin/clavulanate 750 mg IV at IA **or** Ampicillin/sulbactam 1.5 gm IV at IA	< 1 day
Open biliary (clean-contaminated)	Enteric GNB	Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV IA **or** 2GC 1-2 gm IV at IA	< 1 day
Open cholecystectomy (clean-contaminated)	Enteric GNB	Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA **or** 2GC 1-2 gm IV at IA	< 1 day
Laparoscopic cholecystectomy (clean-contaminated)	Enteric GNB	Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA **or** 2GC 1-2 gm IV at IA	< 1 day
Gastroduodenal (clean-contaminated)	Gram-positive cocci Enteric GNB	Cefazolin 1-2 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA	< 1 day
Intestinal (clean-contaminated)	Gram-positive cocci Enteric GNB	Cefazolin 1-2 gm IV at IA	Clindamycin 600 mg IV + gentamicin 2 mg/kg IV at IA	< 1 day
Laparoscopic or non-laparoscopic herniorrhaphy with mesh (clean)	*S. aureus* CoNS	Cefazolin 1 gm IV at IA	Clindamycin 600 mg IV at IA	1 dose
Laparoscopic or non-laparoscopic herniorrhaphy without mesh (clean)	*S. aureus* CoNS	Nil or Cefazolin 1 gm IV	Clindamycin 600 mg IV at IA	1 dose
Breast (clean)	*S. aureus* CoNS	Nil or Cefazolin 1-2 gm IV	Clindamycin 600 mg IV at IA	1 dose
Thyroid (clean)	*S. aureus* CoNS	Nil or Cefazolin 1-2 gm IV	Clindamycin 600 mg IV at IA	1 dose

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Urology				
Transrectal prostate biopsy (clean-contaminated)	Enteric GNB	Cefazolin 1 gm IV at IA	Gentamicin 2 mg/kg IV **on call to OR** **or** Ciprofloxacin 500 mg oral or 400 mg IV **on call to OR**	1 dose
Transurethral prostate biopsy (clean-contaminated)	Enteric GNB	Cefazolin 1 gm IV at IA	Gentamicin 2 mg/kg IV **on call to OR** **or** Ciprofloxacin 500 mg oral or 400 mg IV **on call to OR**	< 1 day
Transurethral bladder tumor resection (clean-contaminated)	Enteric GNB	Cefazolin 1 gm IV at IA	Gentamicin 2 mg/kg IV **on call to OR**	< 1 day
Gynecology & Obstetrics				
Hysterectomy, abdominal or vaginal (clean-contaminated)	Enteric GNB Group B streptococcus Anaerobes	Cefazolin 1 gm IV at IA **or** Cefoxitin 1 gm IV at IA **or** Cefmetazole 1 gm IV at IA	Clindamycin 600 mg IV at IA + gentamicin 2 mg/kg at IA **or** (Amoxicillin/clavulanate 750 mg IV at IA **or** Ampicillin/sulbactam 1.5 gm IV at IA)	< 1 day
Cesarean section (clean-contaminated)	Enteric GNB Group B streptococcus Anaerobes	Cefazolin 1-2 gm IV immediately after cord clamping	Clindamycin 600 mg IV at IA + gentamicin 2 mg/kg at IA	< 1 day

Abbreviations: CoNS = coagulase-negative staphylococci; GNB = Gram-negative bacilli; IA = induction of anesthesia; IV = intravenous; 2GC = second-generation cephalosporins; OP = operation; OR = operating room.

[a]Indications for vancomycin: 1) penicillin allergy; 2) high rate of MRSA in the hospital.

[b]For non-complicated appendicitis, the first dose of antibiotics should be given when diagnosis has been made and a second dose can be given at induction of anesthesia.

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