Timing of Prophylactic Antibiotics for Surgery: A Review

**Context**

A surgical site infection is a complication of surgery. It can lead to longer hospital stays, illness, and death. The risk of developing an infection at the surgical site depends on many factors, such as the type of surgery being performed and the health of the patient. Surgical site infections occur in approximately 3% of surgeries overall, but range from 2% in clean surgical sites to 10% in dirty surgical sites. Prevention measures include limiting the length of the hospital stay before surgery, pre-operative showers, local skin preparation, and antibiotic prophylaxis.

**Technology**

Antibiotics are drugs used to combat bacterial infections — when given prophylactically, they prevent bacterial infections from developing. The efficacy of antibiotic prophylaxis is well established when patients are at a high risk of infection or when the occurrence of an infection would have grave consequences for patients (e.g., immunocompromised patients).

**Issue**

The appropriate timing of antibiotic therapy pre-operatively allows for adequate blood and tissue concentrations. It has been shown that the administration of antibiotics within one to two hours before surgery reduces surgical site infections compared with antibiotics given more than two hours before surgery. However, it is not always possible to administer antibiotics during this time frame. It is uncertain whether antibiotics given 30 to 60 minutes before surgery are more effective than if administered immediately before surgery. This report will review the clinical evidence to help guide decisions about the timing of prophylactic antibiotics given before surgery.

**Methods**

A limited literature search of key resources was conducted, and titles and abstracts of the retrieved publications were reviewed. Full-text publications were evaluated for final article selection according to predetermined selection criteria (population, intervention, comparator, outcomes, and study designs).

**Key Messages**

For the prevention of surgical site infections, the optimal time to administer pre-operative antibiotic prophylaxis may be 30 to 60 minutes.

- The evidence was limited.
- This finding might not apply to patients with underlying conditions or to antibiotics not covered in this review.
- In most of the studies included in this review, patients also received prophylactic antibiotics after surgery, as per accepted standards.

The included studies examined cefazolin, cefuroxime, vancomycin, ciprofloxacin, and levofloxacin.

**Results**

The literature search produced 185 citations with an additional 7 reports identified from the grey literature. Of these, 36 were deemed potentially relevant and 4 observational studies met the criteria for inclusion in this review.