

# Prophylactic Versus Therapeutic Antibiotic Therapy Following Appendicectomy

Muqdad Fuad Abdulkareem (MBChB, FICMS)<sup>1</sup> and Humamalddin Edan Hussein (MBChB, FICMS)<sup>2</sup>

## Abstract

**Background:** In the first 4 hours after a breach in an epithelial surface and underlying connective tissues made during surgery or trauma, there is a delay before host defences can become mobilised through acute inflammatory, humeral and cellular processes. This period is called the 'decisive period' and it is during these first 4 hours after incision that bacterial colonisation and established infection can begin. It is logical that prophylactic antibiotics will be most effective during this time. Following closure of the wound, local intravascular coagulation and the events of early inflammation that initiate wound healing seal its environment: this may explain why the postoperative administration of antibiotics is ineffective in preventing wound infection.

**Objective:** To investigate the benefit of prolonged antibiotic therapy following appendicectomy of uncomplicated appendicitis in preventing surgical site infection.

**Patients and Methods:** Two hundred patients who undergone appendicectomy had been reviewed prospectively over a period of one year and eight months (January 2009-August 2010) in the surgical ward in Baquba teaching hospital, reviewed for the need for prolonged antibiotic therapy in decreasing the incidence of surgical site infection. All of the patients have uncomplicated appendicitis (non-perforated). The patients are divided into two groups. In group 1 the patients given single dose of antibiotic (Cefazolin) at the time of induction of anesthesia and only two doses postoperatively. In group 2, the patients did not receive preoperative antibiotic but given prolonged antibiotic cover first parenteral then enteral till the time of removal of stitches. The two groups are examined for the development of surgical site infection.

**Results:** No significant difference in the incidence of occurrence of surgical site infection between the two groups.

**Conclusion:** Prolonged postoperative antibiotic therapy is of no value in preventing surgical site infection in patient underwent appendicectomy for uncomplicated appendicitis.

**Key words:** Appendicitis, Surgical site infection.

**Corresponding Author:** muqdadfuad@yahoo.com

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<sup>1</sup>College of Medicine -University of Diyala-Diyala- Iraq.

<sup>2</sup>Baquba Teaching Hospital-Diyala- Iraq .

## Introduction

Appendicitis is the most common cause of acute abdominal pain requiring surgical intervention. Despite improved asepsis and surgical techniques, postoperative complications, such as wound infection and intraabdominal abscess, still account for a significant morbidity [1].

Wound infection is the commonest complication after appendectomy, occurring in as many as 30% of patients. Various methods have been used to minimise the incidence of wound infection [2].

In the first 4 hours after a breach in an epithelial surface and underlying connective tissues made during surgery or trauma, there is a delay before host defences can become mobilised through acute inflammatory, humeral and cellular processes. This period is called the 'decisive period' and it is during these first 4 hours after incision that bacterial colonisation and established infection can begin. It is logical that prophylactic antibiotics will be most effective during this time.

Bacteria are normally prevented from causing infection in tissues by intact epithelial surfaces, but these are broken down by surgery. The most extensive physical barrier is the skin. In addition to the physical barrier posed by the epithelial surface, the skin harbors its own resident microflora that may block the attachment and invasion of noncommensal microbes. Microbes also are held in check by chemicals that sebaceous glands secrete and by the constant shedding of epithelial cells [3].

If antibiotics are given empirically they must exert their action when local wound defenses are at their least (the decisive period). Ideally, maximal blood and tissue levels should be achieved at incision before contamination occurs. Intravenous

administration at induction of anesthesia is optimal. In long or prosthetic operations, or unexpected contamination, antibiotics may be repeated 8 and 16 hours later[4].

A surgical incision exposes normally sterile tissues to a nonsterile environment; some contamination occurs with any operation. Bacteria may start multiplying before effective host defenses are established, and if initially present in a concentration exceeding 100 000 organisms/g tissue, may exceed the host defense capacity. Host defenses also recognize damaged and dead tissue, which are eliminated by the same humoral and cellular mechanisms as those used to defeat invading bacteria. Thus, there is a need for gentle operative technique to minimize the volume of damaged tissue and for adherence to principles of aseptic surgery to reduce the amount of bacterial contamination[5].

Following closure of the wound, local intravascular coagulation and the events of early inflammation that initiate wound healing seal its environment: this may explain why the postoperative administration of antibiotics is ineffective in preventing wound infection. Antibiotics administered preoperatively diffuse into the peripheral compartment, in this case the wound fluid; since the wound is saturated with antimicrobials at the time it becomes contaminated, potentially invading bacteria are inhibited from multiplying and many are killed[6].

Preoperative administration of prophylactic antibiotics has proven to be a safe and effective means to reduce wound and intra-abdominal septic complications after selected potentially contaminated operations. The role of such prophylactic therapy has been adequately established to be beneficial in patients undergoing

appendectomies for acute non-perforated appendicitis[7].

Aim of the study :To test the effectiveness of prolonged postoperative antibiotic therapy in preventing the occurrence of wound infection following appendicectomy.

### Patients and Methods

Two hundred patients who undergone appendicectomy had been reviewed prospectively over a period of one year and eight months (January 2009-August 2010) in the surgical ward in Baquba teaching hospital, reviewed for the need for prolonged antibiotic therapy in decreasing the incidence of surgical site infection.

All of the patients have uncomplicated appendicitis (non-perforated) i.e. the perforated and gangrenous appendicitis had been excluded from the study.

The patients are divided into two groups each is 100 patients. In group 1 the patients given single dose of antibiotic (Cefazolin) at the time of induction of anesthesia and only two doses postoperatively, then the patient continue on placebo (B plex capsule) till the time of removal of stitches after 7 days.

In group 2, the patients did not receive preoperative antibiotic but given prolonged antibiotic cover parantal then enteral till the time of removal of stitches. Antibiotics chosen are metronidazol plus cephalosporin.

All the patients are advised not to change dressing. The two groups are examined for the development of surgical site infection at the time of removal of wound stitches. The wound is regarded as being infected if there is any sign of infection as redness, pain and tenderness, or the presence of frank pus (abscess).

### Statistical Analysis

The statistical method followed for achieving the results are the percentages and numbers.

### Results

Two hundred patients undergone appendicectomy are included in the study. The patients are divided into two groups each is 100 patients.

The number of wound infection cases encountered in group 1 was 10; four patients was having abscess Table (1).

All of those 10 patients managed as an outpatient.

The number of patients in group 2 who developed wound infection was 13; three of them were having abscess. Table (2) Again all of those infected wounds managed as an outpatient. Antibiotics given for infected wounds without abscess while abscesses are managed by drainage.

**Table (1):** Incidence of wound infections in group 1.

No of patients	No of SSI cases	%	Wound abscess	%
100	10	10	4	4

**Table (2):** Incidence of wound infections in group 2.

No of patients	No of SSI cases	%	Wound abscess	%
100	13	13	3	3

### Discussion

200 patient undergone appendicectomy over a period of one year and eight months. Short period treatment is given in 100

patients while prolonged antibiotic therapy is given for another 100 patients.

10 patients (10%) in group 1 developed SSI, while in group 2 13 patients (13%)



developed wound infection. These results are in concordance with that of Evans C, Pollock AV. who established that single preoperative and short (24 hours) antibiotic therapy is equivalent to prolonged (more than 6 days) therapy in preventing SSI [8].

Other studies that support our study are those performed by Chang WT et al, Fabian TC et al and Winslow RE, Dean RE, and. And those by Foster PD, O'Toole RD. [9, 10,11and [12]. All of them proved that prophylactic antibiotics with 2-4 doses postoperatively has great role in the prevention of surgical site infection [6].

### Conclusion

Many facts can be concluded from this study:

1. Preoperative antibiotic dose is essential in preventing SSI as it covers the decisive period, during which the risk of infection is the highest.
2. Short period (24 hrs) antibiotic cover is equivalent to prolonged antibiotic therapy in preventing SSI.
3. As most of the patients have uncomplicated appendicitis, so most of the patients can be saved the extra cost of unnecessary antibiotics.

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