

# Is abandoning routine peritoneal cultures during appendectomy justified?

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## ABSTRACT

**Objective:** To identify if there are any advantages of taking swab from the peritoneal fluid during appendectomy, and if it has any clinical implication on the progress of diseases.

**Methods:** Records of 160 patients who underwent appendectomy in Saqr Hospital, Rak, United Arab Emirates, from 2003 - 2005, and had culture and sensitivity from the peritoneal cavity were reviewed retrospectively. The macroscopic picture of the appendix, microorganism in peritoneal cultures, antibiotic, and the extent of using the result of the culture and sensitivity were evaluated. Patients with normal appendix who underwent laparoscopic appendectomy were excluded

**Result:** Patients age ranged from 4-55 years with male to female ratio of 4:1, all had prophylactic antibiotics and standard surgical procedures; 60% had perforated appendix, 13% were gangrenous. The most common organisms cultured were, *Escherichia coli* and bacteroids, rate of wound infection was 5%. None of the patients had their course of antibiotics adjusted in response to the result of the swab.

**Conclusion:** Swabs from the peritoneal cavity during appendectomy do not have any clinical advantage especially with the empiric use of antibiotics and the short hospital stay.

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peritoneal cavity has no effect or advantage on the course of the disease.<sup>1</sup> The postoperative adjustment of the antibiotics in some cases depends on the clinical assessment rather than the result of the swab. The purpose of our study is to evaluate the clinical application, and the culture and sensitivity result.

**Methods.** The records of 160 consecutive patients with acute appendicitis were reviewed and studied retrospectively. The study population comprised all patients who underwent appendectomy for clinically diagnosed acute appendicitis. The majority of the residents in this area are working class males. This study was carried out in Saqr Hospital, Rak, United Arab Emirates, from 2003 to 2005. Patients operated laparoscopically were excluded from the study. It is the Departmental policy to give routine prophylactic antibiotics to all patients undergoing appendectomy, and to send a routine swab from the peritoneal cavity for culture and sensitivity. The prophylactic antibiotic depends on the surgeon's preference and the availability of drugs. Those clinically suspected of complicated appendix, such as peritonitis and abscess, received triple antibiotics, 2nd or 3rd generation cephalosporin (Cefuroxime 1 gm/8 hourly, Ceftriaxone 1-2gm/12 hourly), amikacin (15 mg/kg/day divided into 2 or 3 equal doses), and metronidazole (500mg/8 hourly) while patients with clinically non-complicated appendicitis received 2nd generation cephalosporin and metronidazole just before induction of anesthesia. Macroscopic picture of the appendix written by the surgeon was recorded, as well as the type of prophylactic antibiotics given. The patients were divided into 3 groups; those who received their swab result while in the hospital (group 1), those

Peritoneal cavity swab is a routine procedure during appendectomy. The indications and the advantages of taking a swab has been questioned and challenged, especially with standardized prophylactic antibiotics, the call for short hospital stay and the introduction of laparoscopic appendectomy. Recent data suggest that the result of the culture and sensitivity from the

who received it on the day of discharge (group 2), and those with no result in their file on discharge (group 3). Those with positive microbiological result sensitivities of isolates were also recorded. The number of patients with wound infection was also recorded. The approval from the ethics committee of Saqr Hospital was obtained.

Epi info 6, the standard statistical software for the Centers for Disease Control and Prevention was used for the statistical analysis. Chi-square test and a simple descriptive statistic were used to analyze the data.

**Results.** The incidence of appendicitis in our area is around 0.8/1000 populations per year. There were 131 (81.9%) male and 29 (18.1%) female patients, this high male proportion which exceeds 4:1 ratio is due to the high rate of young male working expatriates. Age ranged from 4-55 years (with mean age of 23.45). Of the total patients, 25% were under the age of 14 and 42.7% were between the ages of 20-30 years, only 5% were over 40 years of age. More than 50% of the patients had ceftriaxone and metronidazole as prophylaxis antibiotic, while the rest received a single or a triple prophylaxis antibiotic depending on their clinical state and the expected severity of the appendicitis. The majority of the patients were explored via a Mac Burney incision, and all had swabs taken from the peritoneal cavity, regardless of the presence of fluid. Macroscopically, the majority of the appendix was non-perforated category, of this 54.1% were suppurative (**Table 1**). Out of 160 intra-peritoneal swabs sent to the laboratory for culture and sensitivity, only 28.1% were received while the patient were still in the department, 5% on the day of discharge, and 66.9% after the patient left the hospital. Out of those received in the department, only 19 samples yielded a positive result (11.9%) (**Table 2**). *Escherichia coli* and bacteroids were the most common microorganisms cultured from the peritoneal cavity.

None of the 45 results received changed or adjusted the course of antibiotic therapy given to the patients. The majority of those with complicated appendix continued

on the same empiric antibiotic therapy received for prophylaxis, while some had the course changed regardless of the swab result. Eight of our patients had wound infection. Six of them were re-admitted; swab was taken from the wound and systemic antibiotic was given without referral to the swab taken during surgery.

**Discussion.** The effect of prophylactic antibiotics in reducing post appendectomy complications is well established. The range of prophylactic antibiotics depend on the expected finding, especially with our understanding of intra abdominal infections.<sup>2-4</sup> Appendectomy is at the top of our emergency surgical list. In our study, only 19% had positive culture and sensitivity results, which is consistent with those of other published figures.<sup>3-5</sup> In our institute, intra-peritoneal swab is a routine procedure, regardless of the presence of peritoneal fluid or the macroscopic appearance of the appendix. Its advantage has never been questioned. The report of the swab result takes on average 3 days to arrive to the department, which the majority of the patients would have been discharged. In our cases, 66.9% of the patients were discharged with no result of the swab in their record. In those patients in whom the result was obtained while they were staying at the hospital, there was no influence on the prognosis of the treatment course and the clinical outcome. Post-operatively, some patients with complicated appendicitis had their therapeutic antibiotic adjusted strictly on clinical grounds, and none were as a consequence of the result of the swab. The antibiotic selection was made on the predictability of the type of bacteria and proven efficacy of empiric antibiotic therapy.<sup>1,6</sup>

Soffer et al<sup>7</sup> changed the antibiotic in only 1% of their perforated appendix patients in response to the result of the culture and sensitivity, while Kokoska et al<sup>8</sup> changed 16% of their perforated appendix patients, Dougherty et al<sup>9</sup> changed the antibiotic in 7% of their patient, and only 2% were influenced by the

**Table 1** - Macroscopic picture of the appendix.

| Findings             | Frequency<br>n (%) |
|----------------------|--------------------|
| Appendicular abscess | 3 (1.9)            |
| Appendicular mass    | 6 (3.8)            |
| Gangrenous           | 22 (14)            |
| Peritonitis          | 1 (0.6)            |
| Simple               | 40 (25.5)          |
| Suppurative          | 85 (54.1)          |
| <b>Total</b>         | <b>157 (100)</b>   |

**Table 2** - List of organisms cultured from the peritoneal cavity.

| Bacteria growth                | Frequency |
|--------------------------------|-----------|
| <i>Coliform bacillus</i>       | 14        |
| <i>Bacteroides</i>             | 8         |
| <i>Pseudomonas</i>             | 6         |
| Others                         | 4         |
| <i>Enterococcus</i>            | 3         |
| <i>Hemolytic streptococcus</i> | 4         |
| <i>Staphylococcus aureus</i>   | 2         |

result of the swab. The traditional practice of obtaining routine intra-peritoneal cultures in patients operated upon for acute appendicitis offers no clinical advantage, and has been reviewed and questioned by many.<sup>9-13</sup> The majority of appendicitis are of the non complicated category, have short hospital stay, early discharge prior to getting the swab result, and have high negative result in this group.<sup>14,15</sup> Helmer et al<sup>16</sup> showed significant reduction in the incidence of infectious complications after appendectomy in perforated and gangrenous appendicitis, with a standardized approach to antibiotic therapy and wound management.

In conclusion, it is clear that intra-operative peritoneal cultures during appendectomy do not add to the treatment of appendectomies. There is no advantage in obtaining peritoneal swab if the result arrives after the discharge of the patient, with the majority showing no growth. It is costly, time consuming, and unnecessary. Nevertheless, it should be reserved for patients with abscess and peritonitis, with the stress on early communication of the result to the department, within the first 24-48 hours. In non-perforated appendicitis, this time honored procedure of taking swabs could be abandoned safely except for high-risk groups, which include the very young and the very old and immunosuppressed patients. As majority of our patients have non-complicated acute appendicitis, future study involving immunocompromised group of patients and those with complicated acute appendicitis should be carried out to further confirm this result.

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