

## Prescribing Antibiotics in the Emergency Room of Damascus Hospital

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### Abstract

**Background:** Resistance to antibiotics secondary to misuse and overuse of antibiotics is alarming according to WHO reports. During the war care is emergency oriented, we wanted to track antibiotics prescription in Emergencies.

**Objectives:** This study aims to highlight the excessive and unnecessary prescribing of antibiotics at the Emergency Room of Damascus hospital, which could result in bacterial resistance to antibiotics. We will analyze the prescribing of antibiotics in the emergency room (ER) and discuss its relevance in order to make recommendations for antibiotic use in emergency rooms in hospitals during the war across Syria.

**Methods:** We surveyed a random sample of 110 patients that presented to the ER at Damascus Hospital between April 2018 and July 2018.

For each patient, the same questions were posed regarding clinical presentations and complementary tests (laboratory or radiological) for initial diagnosis.

**Results:** Our results are reported in a table separating prescribed antibiotics for urinary, respiratory, digestive, and trauma related cases. We will report over prescription:

- Non-inflammatory Enteritis: 6 cases out of 6 received Metronidazole.
- Bronchitis: 4/4 received macrolides.
- Upper respiratory tract infection: 12/12 received Amoxicillin-Clavulanic acid.
- Closed war injuries: 30 out of 30 received Amoxicillin-Clavulanic acid.
- First degree burns: 2/2 received Amoxicillin-Clavulanic acid.

**Conclusion:** We highlight the overwhelming overuse of large spectrum antibiotics: Amoxicillin-Clavulanic acid for acute Upper Respiratory Tract Infection, and closed war injuries for prophylaxis. This should be avoided, in order to prevent emerging bacterial resistance.

**Keywords:** Antibiotics; Emergency Room; Damascus Hospital; Amoxicillin-Clavulanic Acid

### Introduction

Antibiotics are drugs used to prevent and treat bacterial infections. Antibiotic resistance occurs when bacteria change and adapt in response to the use of these drugs [1]. This resistance leads to higher medical costs, extended hospital stays and increased mortality [1].

In recent years, the world has aimed towards changing the way antibiotics are prescribed and used. Even if new drugs are introduced, antibiotic resistance will continue to pose a major threat unless the use of drugs is altered [1]. The misuse and overuse of antibiotics over the years has, in fact, allowed for resistant bacteria to thrive, whilst slowly wiping out sensitive bacteria. In Syria misuse of antibiotic has never been studied, we were surprised to see over prescription of antibiotics in ER for this reason, we decided to track the use and misuse of antibiotics in the ER of Damascus hospital.

**Methods**

**Participants**

We selected a random sample of patients who visited the ER of Damascus Hospital between the months of April and July 2018. It should be noted that this study did not include all the patients present in the ER.

A table was created and divided into cells with the following components: patient age, sex, symptoms, clinical signs, laboratory data, radiology, supposed diagnosis, the drug prescribed, duration of use, and indications for prophylaxis. The results were reported as a number and frequency.

We will find all the data in the link: <https://www.dropbox.com/s/0g4vbihlwy8j9yj/Table-1.pdf?dl=0>

**Ethical approval**

Our study was approved by the ethical committee of the Syrian Private University and Damascus Hospital. Patient consent was also granted by all patients.

**Results**

Ten digestive, respiratory, urinary, and trauma related infections were included in table 2. We found overprescribing of antibiotics in cases not requiring them, specifically non-inflammatory enteritis, viral acute upper respiratory infection, bronchitis, closed Injury, first degree burns.

Diagnosis	Number of patients	Antibiotic prescribed?	Appropriate prescription?	The prescribed antibiotic
Inflammatory Gastroenteritis	8	Yes	Yes	Metronidazole
Non-inflammatory Enteritis	6	Yes	No	Metronidazole
UTI	15	Yes	Yes	Quinolones
Pneumonia	12	Yes	Yes	Macrolides
Bronchitis	4	Yes	No	Macrolides
Upper respiratory tract infection	12	Yes	No	Amoxicillin-Clavulanic acid
Open Injury	18	Yes	Yes	Amoxicillin-Clavulanic acid
Closed Injury	30	Yes	No	Amoxicillin-Clavulanic acid
First Degree Burns	2	Yes	No	Amoxicillin-Clavulanic acid
Burns of the Second Degree or Higher	3	Yes	Yes	Amoxicillin-Clavulanic acid

**Table 2:** Diagnosed illnesses and antibiotic (over or misuse) prescribing in ER ,Damascus Hospital.

From a random sample of 110 patients, the following cases were reported:

- Gastrointestinal cases: 14 (12.7%).
- Urinary cases: 15 (13.6%).
- Respiratory tract infection cases: 28 (25.4%).
- Trauma and Fracture cases: 53 (48.18%).

No bacterial isolation was done for these cases. Laboratory analysis was used in cases involving urinary system (urinalysis), while radiological analysis was only used in cases involving the respiratory system when clinical suspicion of pneumonia. For the remaining diagnosed cases, clinical analysis and treatment was based only on clinical symptoms

### Discussion

In third world countries, there are no guidelines for antibiotic use [1] and while observing ER training in the hospital, we noticed that there was an issue of over prescribing and use of the inappropriate large spectrum antibiotic

According to the World Health Organization (WHO), the principle for the wise use of antibiotics is that antibiotics should not be used to treat non-bacterial infections. This principle is derived from the basic rule of logical use of drugs that states that medicines should be used appropriately in accordance with clinical needs [1]. Antibiotics are to be properly used and prescribed, especially in cases not requiring such prescription such as upper respiratory tract infections, especially colds with laryngitis, acute diarrhea and minor wounds [1]. The Center for Disease Control (CDC) supports this principle, especially for the aforementioned cases, which is what drove us to highlight ten diagnosed illnesses with their prescribed treatment [2]; Based on the results highlighted in table 2, our recommendation is to reduce the utilization and unnecessary prescribing of antibiotics.

### Gastrointestinal system

According to the Center for Disease Control, acute diarrhea is defined as the sudden onset of defecation of liquid stools that differ from normal stools 3 or 4 times within 24 hours, whereas persistent or chronic diarrhea lasts from 14 to 30 days. Infection-associated diarrhea, such as diarrhea attributed to gastroenteritis, presents with accompanying clinical symptoms such as nausea, high fever, bloating and a sense of dysentery. According to research, the treatment plan includes [3]:

- 1) In the case of watery diarrhea with mild symptoms: Only hydration. 4 mg of Loperamide to control the diarrhea.
- 2) In the case of moderate to severe symptoms there are two types of diarrhea:
  - a) Traveler's diarrhea: The treatment plan is highlighted in table 3.
  - b) Non-traveler's diarrhea: There are two cases:
    - i. If there is no or low-grade fever less than 100 degrees F accompanied by diarrhea that lasted less than 48 hours, Loperamide is administered.
    - ii. If the fever is higher than 101 degrees F, and diarrhea lasts less than 72 hours, Loperamide is administered. If the diarrhea lasts for more than 72 hours, microbiological assessment is required, and empiric treatment should be given as follows: A single dose of Azithromycin 1g or Azithromycin 500 mg once daily for 3 days.
- 3) In the case of dysenteric diarrhea (passage of grossly bloody stools) [2] there are two cases:
  - a) No fever or fever below 100 degrees F: Microscopically analysis is performed and antibacterial agents are given.
  - b) As for severe symptoms and fever more than 101 degrees F, there are two types: non-traveler's and traveler's diarrhea. Both must be evaluated microscopically and given Azithromycin 1g empiric treatment in a single dose or given Azithromycin 500 mg once daily for three days.

Antibiotic	Dose	Treatment and Duration
Levofloxacin	500 mg by mouth	Single dose or a 3-day course
Ciprofloxacin	750 mg by mouth or 500 mg by mouth	Single dose or a 3-day course
Ofloxacin	400 mg by mouth	Single dose or a 3-day course
Azithromycin	1,000 mg by mouth or 500 mg by mouth	Single dose or a 3-day course
Rifaximin	200 mg by mouth three times daily	3-day course

**Table 3:** Antibiotics used to treat acute diarrhea [4].

Bismuth subsalicylates can be administered to control the rate of stool passage and may help travelers function better during bouts of mild-to-moderate illness (strong recommendation, high level of evidence) [3].

Of the initial 110 patients surveyed, 14 cases were recorded for GI infections. Of the 14, 8 patients were diagnosed with gastroenteritis based on the presentation of clinical symptoms (acute diarrhea, abdominal pain, high fever), while the remaining 6 cases had non-inflammatory diarrhea based on the clinical symptoms present (acute diarrhea and abdominal pain only). There was no laboratory confirmation of the diagnoses.

All patients were prescribed 500 mg of metronidazole (known as Flagyl) three times daily. This treatment method disagrees with research studies and references for the diagnosis and treatment of acute diarrhea, which states that it is not enough simply to rely on clinical symptoms to diagnose and treat acute diarrhea. Even traditional methods of diagnosis (bacterial cultures, microscopy with and without special stains and immunofluorescence, and antigen testing) have failed to reveal the etiology of the majority of cases of acute diarrheal infection, therefore, stool diagnostic studies may be used if available in cases of dysentery, moderate to severe diseases, and symptoms lasting more than 7 days to clarify the etiology. If diarrhea is the only presenting symptom, then antibiotics are not to be prescribed.

**Urinary system**

A total of 15 cases were recorded for these patients, all of whom were urinary tract infections based on clinical symptoms (pain flank and burning during urination) and on laboratory urinary analysis. All of the patients were prescribed two doses of ciprofloxacin 500 mg.

Studies show that both clinical symptoms and laboratory testing should be present when urinary tract infections are diagnosed. Research conducted previously shows that the prescription of antibiotics is correct but must rely on urine culture and not just urinalysis [5] to be certain of the antibiotic needed. In the case of lower UTI/Cystitis [5] (UTI without involvement of the kidneys, whether complicated or uncomplicated) the treatment plan is Bactrim or fluoroquinolones (250 - 500 - 400 mg) for 3 days or Nitrofurantoin (100 mg), beta-lactam for 5 days. For upper UTI's/ pyelonephritis [6]: (infection of the kidneys) the treatment plan is Ciprofloxacin (500 mg) or levofloxacin (750 mg) for 7 days if the patient improves rapidly, and 10 - 14 days if the patient's response is delayed. In the cases of UTI's involving a catheter [7], treatment is the same as upper UTI's for 7 days if there is rapid improvement or 10 - 14 days if patient response is delayed.

**Trauma**

A total of 53 cases were recorded for these patients which included (open Injury, closed Injury, first degree burns, and burns of the second degree or higher). Burns that affect only the surface layer of the skin are known as surface burns or first-degree burns. When damage reaches some layers under the skin, it is known as partial deep burning or second-degree burning.

Treatment of first-degree burns includes the exposure of the affected area to cold water for five minutes or more, as well as taking painkillers such as acetaminophen or ibuprofen [8]. Treatment of second degree burns also includes exposing the affected area to cold water for 15 minutes or more, as well as taking painkillers such as acetaminophen or ibuprofen and using an antibiotic ointment on the blisters [8]. Third-degree burns are the most severe of all previous types and require surgical intervention. The burn wound could take a long time to heal [8].

In closed Injury, the outer skin remains intact without rupturing or injuring, hence we do not need to use antibiotics [9], but in open Injury, the injury is accompanied by cuts in the outer skin, therefore we use antibiotics for fear of infection [9]. In our studied cases there is misuse in antibiotics prescribed for closed Injury and first degree burns, which is described as not recommended in studies, as resistance is enhanced by these antibiotics, especially in the case of open injuries with a need for prescribed antibiotic.

### Respiratory tract infections

(Amoxicillin-Clavulanic acid) Augmentin\* was prescribed to 12 upper respiratory tract infections, azithromycin to 12 pneumonia, and clarithromycin to 4 acute bronchitis.

It is alarming to see that wide spectrum antibiotic augmenting\* is prescribed when non-need for it, Upper Respiratory tract infection (Common cold, oropharyngitis, sinusitis, tonsillitis) is rather viral, and immediate use of antibiotic is not recommended [10-12].

While for Community acquired pneumonia (CAP) the prescribed antibiotic is azithromycin. Azithromycin is not the macrolide of choice for CAP. We recommend clarithromycin, or maxixillin, or maxicillin and augmentine [8] if co-morbidities [10-12].

### Conclusion

In our emergency room there is overuse and misuse of antibiotics, it seems like prescription of antibiotics is the rule, in our sample all the following do not need really antibiotics in non-inflammatory enteritis (6 cases), Bronchitis (4 cases), UPTI (12 cases), and (32 cases) trauma antibiotics were prescribed as prophylaxis, while not recommended. Quinolones were overprescribed while they are not recommended neither for prophylaxis, nor for first line prescription in general and 12 upper respiratory tract infections received large spectrum antibiotics (Augmentin), which is wrong attitude. So we hope these results should urge us to consider setting national guidelines for the use of antibiotics in ER.

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