Acquired Error in using Antibiotic for Surgery Patients in Iraqi Hospitals[#]

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Abstract

The use of antibiotics (AB) in surgery focused in either treating established infection or to prevent suspected post-operative infection. Inappropriate use of antibiotic for treatment of patients with common infections is a major problem worldwide, with great implications with regards to cost of treatment and development of resistance to the antimicrobial agent. Moreover, antibiotics may often be dispensed without a clear clinical indication. This study was conducted to estimate the medication errors in using antibiotic for surgery patients which may effect their wound healing. A 260 patients with clean-contaminated and contaminated surgery were included from two teaching hospitals, 160 patient from Medical city hospital and 100 from Al-kadhimiya hospital, 86% were female and 32% were male, their age range was 40 +/- 15. The study shows that there are medication errors related to different causes: firstly, medical team error which include the nurse (70.9%) and the physician which include 1) delay in patient follow up after operation(5.9%) , 2) changing the AB without doing culture and sensitivity test (48.8%), and incomplete prescription order(13.1%). second: ordering error which include: 1) the absent of original source of AB (44.5%), 2) Error in availability of the chosen AB (74.8%), and third: error related to the patient itself include 1) socioeconomic situation (14.5%), 2) educational state (54.3%), finally error related to increase cost in dispensing more than one AB needed (80.1%), although the healing was (63.6 %), delay in response (25%) and complicated wound infection (5%), significant results were arrange nurse error and poor drug availability. In conclusion: medication errors are still common problem in our hospitals, which are mostly related to medical team and the pharmacists should give more effort to avoid these errors.

Key wards: Acquired error, Antibiotic, Surgery patients.

الخلاصة

استخدام المضادات الحيوية في الجراحة يتركز أما في معالجة الأختلاطات البكتيرية المثبتة أو لمنعها المتوقع بعد العملية. استخدام المضادات الحيوية بشكل غير ملائم لعلاج المرضى مع الاختلاطات البكتيرية الشائعة من أهم المشاكل المنتشرة عالميا", مع نتائج كبيرة نسبة إلى كلفة المعالجة وتطور المقاومة إلى العامل ذو المعاداة الميكروبي. علاوة على ذلك, المضادات الحيوية غالبا" ماتصرف بدون دلالة سريريه واضحة.هذه الدراسة أجريت لتقييم الأخطاء الطبية في استخدام المضادات الحيوية لمرضى الجراحة التي قد تؤثر على شفاء جروحهم. ٢٦٠ مريض من ردهة الجراحة مع جراحة نظيفة-ملوثة وجراحة ملوثة ضمنوا من أثنين من المستشفيات التعليمية, تضمنت الدراسة ١٦٠ مريض من مستشفى مدينة الطب و١٠٠ مريض من مستشفى الكاظمية, ٨٦٪ كانوا نساء و٣٢٪ رجال, مدى أعمارهم كان ٤٠+/- ١٥.هذه الدراسة أظهرت أخطاء طبية تعود إلى أسباب مختلفة: أولا", خطأ الفريق الطبي الذي تضمن الممرضة (٧٠,٩٪) والطبيب وتضمن ١) تأخر في متابعة المريض بعد العملية (٥,٩٪), ٢) تغيير المضادات الحيوية بدون اختبار الحساسية والزرع (٤٨,٨٪), و ٣) عدم اكتمال متطلبات الوصفة (١٣,١٪), ثانيا": خطأ طلبي ويتضمن ١) غياب المصدر الأصلي للمضادات الحيوية (٤٤,٥٪), و خطأ في توفر المضاد الحيوي المختار (٧٤,٨٪), ثالثا": خطأ يعود إلى المريض نفسه ويتضمن ١) الحالة الاجتماعية الاقتصادية (١٤,٥٪), الحالة التعليمية (٥٤,٣٪), وأخيرا" خطأ يعود إلى زيادة التكلفة في صرف لأكثر من مضاد حيوي مطلوب (٨٠,١٪), لكن الاستجابة للشفاء كان (٦٣,٦٪), تأخر في الاستجابة (٢٥٪) وتلوث جروح معقد (٥٪). في الاستنتاج: الأخطاء الطبية تبقى من المشاكل الشائعة في مستشفياتنا والتي غالبا" ما تعود إلى أسباب الكادر الطبي والصيادلة الذين يجب أن يبذلوا جهود أكثر لتجنب هذه الأخطاء.

Introduction

Postoperative wound infection is still one of the most frequent complications observed in surgery patients. Currently, surgical antibiotic prophylaxis (SAP) accounts for over 30% of antibiotic prescriptions in general hospitals. However, in surrey centers, it can be as high as 95%. [1,2] Therefore, monitoring SAP is critical in ensuring appropriate use of antimicrobial agents in this setting. This helps to increase the effectiveness of SAP and minimize the consequences of its misuse, such as the risk of developing antibiotic resistance, adverse events and a higher cost to the institution. The choice of antimicrobial agent, the timing of administration and the duration of prophylaxis are factors that can affect the appropriate use of SAP.[3,4] In a surgery centre, the appropriateness of SAP can be affected by the level of surgical activity, the number of surgical specialities and medical teams working in the same unit. These factors predispose to high variability in SAP practices, leading to antimicrobial misuse. [2]

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Antibiotic usage is one sign of hospital care and cost inclusion that has received much attention over the past decade. Since the misuse of antibiotics has been well documented, [5,6] improved practices for prescribing antibiotics have been suggested as a major goal of quality assurance and cost inclusion [7,8]. In practice, however, individual practitioners and hospitals have worked together to formulate programs that aim to have measure, change, and often improve practices for prescribing antibiotics [9,10]. Antibiotics are high on the list of drugs used for self-medication,[11,12] and physicians may sometimes prescribe antibiotics without a clear clinical indication. [13,14] The aim of the present study was designed to evaluate the prevalence of medication errors of using AB after surgery, and to estimate the causes behind these error.

Patients and Method

This study was carried out at two teaching hospitals (medical city and alkadhimiya hospital) during 3 months. We recorded prospective information from the case sheet of patients after surgical operation. The clean-contaminated and contaminated surgery was included in this study. The demographic data of 260 patients (160 patients from medical city hospital and 100 from alkadhimiya hospital), include their age (40 +/- 15), and gender (86% were female and 32% were male). The acquired medication errors was classified as medical team error, ordering errors, error related to the patient itself, and error related to the cost. Medication errors data were collected and analyzed descriptively.

Result and Discussion

1- Types of medication errors

Table (1) shows errors obtained from both hospitals which are classified into four groups with their percentage. The nurse error included the incomplete administration of the night dose representing (70.9%), while the physician errors include (5.9%) delay in patient follow up after operation, (48.8%) changing the AB without doing culture and sensitivity test, and (13.1%) incomplete prescription order.

Ordering errors include absent of original source of AB (44.5%), non- availability of the AB necessary for each surgery (74.8%). Patient errors include (54.3%) poor knowledge about the AB and (14.5%) of patient compliance concerning proper medication use to prevent any complications. Cost error includes (80.1%) the use of more than one AB needed for each surgery.The Institute of Medicine (IOM) defines medical errors as the failure to complete a planned action as intended or the use of a wrong plan to achieve an aim [15].The study showed the higher percentage of medication errors were related to cost error which was most common cause.

Table 1 : Type of medication error in both hospitals.

Type of medication error	(%) percentage of error
Medical team error	
Nurse error	70.9
Physician error	
a- Delay in follow up	5.9
b- Changing AB	48.8
c- Incomplete prescription order	13.1
Ordering error	
a- Absent of original source of AB.	44.5
b- Error in availability of AB	74.8
Error related to the patient	
a- Socioeconomic situation	14.5
b- Educational state	54.3
Cost	80.1

The IOM report estimates that medical errors cost the Nation approximately $37.6 billion each year; about $17 billion of those costs are associated with preventable errors. About half of the expenditures for preventable medical errors are for direct health care cost, medical team error (nurse error), and prescribing error (availability of AB).[16,17] With many hospital processes, medication delivery is a highly complex, multi-faceted operation involving multiple people and numerous steps. The medication delivery process consists of five basic stages: prescribing ordering, order transcription, dispensing, administering and monitoring. Within each of these stages there are multiple actions, each presenting potential for error. [18] On the other hand, professional nurse is the practitioner most often associated with the responsibility of medication administration. An essential part of every nurse's training is committing to memory and practice the "Five Rights" checklist: right drug, right dose, right route, right time, and right patient [19,20].The nurse may deliver the "right drug" based on the prescribed order, but if the dosage is incorrect, the pharmacist and the nurse missed the opportunity to correct the error. A multidisciplinary approach is necessary to improve medication administration[21].Also, a primary factor contributing to medication errors within the drug ordering system is due to lack of

prescriber information regarding drug therapies. Errors regarding the choice of drug or dosage have been found to be the most likely type to cause injury. Following errors associated with the prescribing/ordering process, medication administration errors are the second most frequent type [22,23].

2- Comparison between medication errors in two Iraqi hospitals

In table (2) we notice that there was significant differences concerning errors related to the nurse (66.5% versus 75.3%) and the availability of AB (78.4% versus 71.1%) between alkadimiya hospital and medical city. In the above comparison we did not include patients error because the same type of population found in both hospitals. Numerous factors in the health care system contribute to medication safety and errors. Some of these factors can be attributed directly to provider organizations, while others can be attributed to the medication-use system itself. In many cases, multiple factors are involved related to professional practice, health care products, procedures, and systems, including prescribing; order communication; product labeling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use. According to a variety of sources, the root cause of medical errors is due to the complexity of todays healthcare system. [24] The IOM emphasized that most medical errors are systems related and not attributable to individual negligence or misconduct. The key to reducing medical errors is to focus on improving the systems of delivering care and not to blame individuals. Health care professionals are simply human and, like everyone else, they make mistakes[25]. Medication errors reported to the FDA may stem from poor communication, misinterpreted handwriting, drug name confusion, lack of employee knowledge, and lack of patient understanding about a drug's directions. "But it's important to recognize that such errors are due to multiple factors in a complex medical system," says Paul Seligman, M.D., director of the FDA's Office of Pharmacoepidemiology and Statistical Science. "In most cases, medication errors can't be blamed on a single person." [26,27] So our results could be part of these medication errors reported regarding the complex medical system in Iraqi hospitals. To avoid these medications misuse, the pharmacists should give information and education to the patients until they understand the role of medications in their health. Besides, educating the pharmacists to increase their roles in community sitting, also avoiding medication errors requires vigilance and the use of appropriate technology to help ensure proper procedures are followed. [28,29] Computerized physician order entry reduces errors by identifying and alerting physicians to patient allergies or drug interactions, eliminating poorly handwritten prescriptions, and giving decision support regarding standardized dosing regimens. [30,31] Moreover we recorded the percentage of healing after surgery regarding more than one AB needed.The complete healing was (63.6 %), delay of response (25 %), and complicated wound infection (5 %), and this is because in such types of clean contaminated and contaminated surgery, the most commonly used AB are a combination of cephalosporins, aminoglycoside, and metronidazole [32,33] to cover the most common infecting organism suspected to cause surgical site infection.[34,35] We concluded that lack of knowledge about drugs and lack of employee knowledge is one of the most common causes of medication errors. A systematic plan for routine and ongoing education for nurses and other clinicians who administer medications should be developed and implemented, in addition , effective role of pharmacist in community and with medical team is most warranted.

Table 2 : Comparison between percentage of medication error in two Iraqi hospitals.

Al-kadhimiya hospital	Medical city hospital	Chi square (P-value)
Nurse error 66.5%	75.3%	0.0005 *
Physician error 4.3%	7.5 %	0.003
Changing AB 45.6%	51.9%	0.005
Absent of original source of AB 44%	45%	1.00
Availability of AB 78.4 %	71.1%	0.0005 *
Incomplete prescription order 10.4%	15.8%	0.586
Cost 77.3%	83%	0.002

* represent significant differences with $p<0.005$

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