Nosocomial infection in a respiratory care unit in Baghdad, Iraq

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ABSTRACT

Background and Objectives: A growing body of literature has shown that health care-associated infections are a major cause of patient's illness and death in developing countries. In Iraq, the real concern in nosocomial infections started late. This work was carried out to assess hospital acquired infections in the respiratory care unit (RCU) in the Surgical Specialties Teaching Hospital, Baghdad.

Methods: Data were collected by reviewing the case records of patients admitted to RCU for two periods from Nov. 2003 to Oct. 2004, and Nov. 2004 to Oct. 2005, before and after the establishment of infection control committee.

Results: A total of 43 (44.8%) patients got nosocomial infection (NIs) out of the total admissions to RCU (96). No significant association between the implementation of guidelines and rate of NIs. A non significant increase in death rate in the 2nd period of the study, and no significant variation in type of isolated bacteria was noticed, also. Age of the patients, site of surgery, and type of surgery, acute respiratory failure and endotracheal intubation were significantly associated with rate of NIs ($p < 0.05$).

Conclusions: Initial success of the infection control committee guidelines combined with ongoing efforts to more consistently implement simple and inexpensive measure for prevention, will lead to wider acceptance of infection control practices.

Key words: Nosocomial infection, respiratory care unit, infection control

INTRODUCTION:

Health care- associated infections, especially in high- risk hospital settings, such as the intensive care unit (ICU) , are the major threat to patient safety [1]. A growing body of literature has shown that health care- associated infections are a major cause of patients illness and death in developing countries [2,3]. Device-associated infection [4-6] pose the greatest threat to patient safety in ICU [3,7]. Most published studies of ICU- acquired infections have come from hospitals in industrialized western countries [4-6,8]. In Iraq, health services were deteriorated during and after Gulf Wars and the sanctions. The capacity of the curative health system was longer worked) and per capita spending was half that prior to 1990 [9-11]. Therefore, the real concern in Nosocomial infection started late [11]. The Ministry of Health established a committee for control of hospital acquired infection (Infection Control Committee, ICC) 2004, which had issued national guidelines to control Nosocomial Infections. This work was carried out to assess hospital acquired infections in the respiratory care unit (RCU) of the Surgical Specialties Teaching Hospital one year before and after implementation of ICC guidelines.

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MATERIALS AND METHODS:

Data were collected by reviewing the case records of the patients admitted to RCU of Surgical Specialties Teaching Hospital for two study periods, the first one was before the implementation of ICC's guidelines from Nov. 2003 to Oct. 2004 (36 patients), and the second one after the implementation of ICC's guidelines from Nov. 2004 to Oct. 2005 (60 patients). A total of 96 patients were included in the study. The diagnosis of infection was approved by culture. The collected data included age, sex, residence at governorate level, dates of admission and discharge, length of hospitalization, outcome of discharge, cause of admission, recent surgical intervention, site of surgery (thoracic, abdominal, orthopedic surgery and others), type of surgery (emergency versus elective), type of anesthesia (general versus local) and instrumentation (intravenous setup, nasogastric tube, urinary catheter, chest tube, wound drain, endotracheal tube, and tracheostomy tube) and the isolated bacteria. Multiple logistic regression was done to determine which variable significantly and independently associated with NIs. Chi square applied to examine the significant association of variables with the rate of NIs in both studied period. Student's t test was used to between the means of length of hospitalization in both study periods. P value less than 0.05 was considered as

RESULT:

significant.

A total of 43 (44.8%) patients had NIs out of the admitted patients to RCU (96). The patients who had NIs infection were hospitalized (19.9 ± 13.3 days) significantly more than patients who had no NIs infection (5.8 ± 4.1 days) ($p < 0.001$). Out of 36 patient, there were 19 (52.8%) patients with NIs before the implementation of ICC's guidelines, and out of 60 there were 24 (40%) with NIs after the implementation of ICC's guidelines. No significant association between implementation of ICC's guidelines and the rate of NIs was observed ($p = 0.2$). Non significant increase in death rate was noticed from 36.1% to 48.3% before and after implementation of ICC's guidelines. No significant variation in the type of isolated bacteria was noticed before and after the implementation of ICC's guidelines. These findings are shown in (Table 1). Table (2) shows significant association between the rate of NIs with the age of the patients ($p = 0.02$), site of surgery ($p = 0.001$), type of surgery ($p = 0.001$), acute respiratory failure ($p = 0.04$),

Table 1 : The association of implementation of ICC's guidelines on nosocomial infection

Variable	Before implementation of ICC's guidelines (Total no. 36)	After implementation of ICC's guidelines (total no. 60)	
	No. (%)	No. (%)	P value
NIs	19 (52.8)	24 (40)	0.2
Death	13 (36.1)	29 (48.3)	0.49
Blood culture	8 (25)	15 (28.3)	0.7
Type of bacteria			
Pseudomonas	3 (37.5)	3 (20)	0.3
Klesiella pneumonia	3 (37.5)	3 (20)	0.3
S. aureus	3 (37.5)	4 (26.7)	0.4
Strept. pneumonia	1 (12.5)	5 (33.3)	0.3
H. influenzae	0 (0.0)	4 (26.7)	0.2
E. coli	2 (25)	3 (20)	0.6

Table 2: The association of studied variables with nosocomial infection

Variable	β	SE	P value
Age	0.95	0.02	0.02
Gender	0.08	0.01	0.8
Residence on governorate level	0.08	0.04	0.19
Month of admission	0.06	0.02	0.65
Recent surgery	0.4	0.01	0.09
Site of surgery	0.94	0.5	0.001
Type of surgery	0.84	0.6	0.003
RTA (Road traffic accident)	0.1	0.04	0.3
Blast and shell injury	0.04	0.02	0.3
Bullet	0.08	0.04	0.4
Myasthenia gravis	0.01	0.1	1
Acute respiratory distress syndrome	0.3	0.02	0.1
Acute respiratory failure	0.97	0.04	0.04
Sever asthma	0.4	0.02	1
Instrumentation			
IV set	0.03	0.1	1
Wound drain	0.02	0.02	0.6
Urinary catheter	0.06	0.01	0.17
Nasogastric tube	0.05	0.02	0.5
Endotracheal tube	0.9	0.04	0.002
Tracheostomy tube	0.4	0.1	0.8
Chest tube	0.5	0.01	0.08

DISCUSSION :

The finding that the rate of NIs was 44.8% is much higher than that reported in developing countries (Jordan [12], 20% and Latin America [13], 23%) and developed countries (United States, 7 – 23%) [14]. This finding may be attributed to the deterioration in the health services during and after Gulf Wars and sanctions [9-11]. High rates of device associated infection in developing countries have many plausible explanations. Most developing countries do not have laws mandating health care-associated infection control programs, and hospital accreditation is not required. Hand hygiene also greatly varies in most centers [15, 16]. Funds and resources for infection control are very limited in most developing countries [17]. The duration of hospitalization was significantly longer in patients with NIs patients without NIs. It replicates a previous finding [6,18]. In line of previous reports [19,20], no significant decline in the rate of NIs was observed after the implementation of ICC's guidelines. The guidelines did not represent an active infection control program, and no surveillance was applied to infection. Surveillance of health care- associated infections- defining the magnitude and the nature of the problem- is the first step toward reducing the risk of infection in vulnerable hospitalized patients [3]. The study revealed no significant variation in the type of isolated bacteria in both periods, before and after the implementation of ICC's guidelines. This finding may indicate that the circumstances in RCU were the same before and after the implementation of ICC's guidelines, so that facilitate the transmission of bacteria.

Transmission of the microorganisms to patients is frequently occurring via hands of health care personnel that become contaminator or transiently colonized with microorganisms [16,17,22]. Hand hygiene is widely recognized as an important but unused measure to prevent NIs [16,17,22,23]. This finding may be attributed to the lack of supervision and monitoring in health system and deterioration in health services [9-11]. Surveillance of high risk procedures and implementation of guidelines developed by physician and nurse for hand hygiene, handling of infant, care of intravenous lines and endotracheal suctioning, then the rate of Nosocomial bacteremia could be decreased. In agreement with other studies [24], age was significantly associated with NIs. The rate of NIs was significantly associated with site of surgery. Similar finding was reported in developed countries [25,26]. The finding that significant variation of rate of NIs with type of surgery is consistent with that of other workers [27,28]. In emergency conditions, there would be break in antisepsis, and the adherence to proper surgical techniques may be reduced, more over, patients undergoing emergency surgery will be in worse condition than those undergoing elective surgery, and these will lead to high NIs rate. The rate of NIs was significantly associated with endotracheal intubation Invasive medical devices used for administration of conventional mechanical ventilation are important contributors to the pathogenesis and development of ventilation associated pneumonia [28] (VAP). The duration of intubation determine the risk for VAP [27, 28]. The finding that the rate of NIs was significantly associated with acute respiratory failure may be due to endotracheal tube. Similar finding was reported by other workers [28].

CONCLUSION:

We hope that the initial success of establishing ICC's guidelines combined with ongoing efforts to more consistently prevention, will lead to wider acceptance of infection control practices and consistent reduction in device associated infection.

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