



RESEARCH ARTICLE

Application of Surgical Safety Checklist (WHO) at Al- Diwaneyah Teaching Hospital

Ali Jawad Hamza Al-Shammari^{1*}, Rami Sabah Al-Diwani¹, Shaimaa Abdul-Ameer Kadhum Al-Zubaidi²

¹. F.I.B.M.S, General Surgeon, College of Medicine, Qadisiyah University, Diwaneyah , Iraq. .

². C.A.B.M.S, Radiologist, College of Medicine, Qadisiyah University, Diwaneyah, Iraq.

*Corresponding Author: Ali Jawad Hamza Al-Shammari

Abstract

Background: Surgery have been considered as one of the global health care important part, however the surgical complications are still common, but can be prevented. Till now, surgery is an essential component of public health and its role is increasing rapidly. Aims: Present study aims to use a safety checklist items to improve team surgical care which will reduce complications and deaths associated with surgery. Patient and Methods: This prospective study enrolled 162 patients using checklist of surgical safety consist of 19 items with different types of operations at Al-Diwaneyah Teaching Hospital in Iraq during the period 1st of February 2018 until 1st of February 2019. We follow the patients until 30 days after surgical intervention. Results: After applying the 19 items of surgical safety checklist to 162 patients, the risk of the surgical site infection (SSI), respiratory complications, missed gauze and risk of blood loss (3.7%, 2.4%, 0.6% and 1.85%) respectively were comparable to the results of the World Health Organization. Pulse oximeter was used in 92.5% and site marking in 65.4%. In 61.73% of patients received antibiotic prophylaxis in which just 3.7% developed surgical site infection, while the extended regime in 38.27%, there is 9.8% with SSI. No mortality reported during the collection of the data. Conclusions: The surgical checklist is a simple and effective method in reducing surgical complications. WHO recommends use of the checklist in all surgical operations and encourages clinicians to modify the list for different specialty and hospitals.

Keywords: Safety check list, Surgical site infection, Surgical complications, Basic surgical care.

Introduction

The First do no harm; is The traditional medical oath which rarely violated intentionally by medicine members like physicians, nurses, or other, but in some countries several patients are harmed every day during health care period All patients have safe care at all times [1]. The Surgery has been a part of world health care [2]. About 234 million operations implemented every year [3] and at least one million die in each year because of surgical complications which experience 7 million people [4, 5].

As a result of increasing the safety problems in health care, it should be to create and disseminate “Solutions” for patient safety [6]. The World Health Assembly (WHA) adopted resolution urging countries to strengthen the safety of health care and monitoring systems

in 2002 due to the worldwide evidence of substantial public health harm because of inadequate patient safety, these resolution also included that WHO takes a lead in setting standards and supporting country efforts and global norms in preparing patient safety policies and practices [7]. Patient health safety issues, safety practices infection of surgery, inadequate anesthetic, safety practices, avoidable surgical infection, also the poor communication among team members have proved to be common, deadly and preventable problems in all countries [8].

The application of using checklist of surgical safety health care is using minimum slandered simple lines that are practical and can be universally apply across countries.

These were arranged into the WHO Surgical Safety Checklist (Fig.1). The checklist identifies of operation consist of three stages, each stage represented as limited period in the normal work, sign in as prior induction of anesthesia, prior to incision of the skin; time out and prior the patient leaves the operating room ;sign out. In each step, a checklist coordinator must confirm that the surgery team has completed the listed tasks before it proceeds with the operation.

According to WHO guidance the Patient Safety which was establishment with consultation with surgeons, anesthetists, nurses, there are ten objectives of safe surgery which created by patient safety experts and patients around the world [9]:

- Team should be operated on the correct patient at the correct site.
- The team should be used known methods to avoiding harm from administration of anesthetic, while protecting the patient from pain.
- The team must be recognized and prepared to avoiding life threatening loss of airway or respiratory function.
- Also team must be recognized and effectively prepared to prevent risk of high blood loss.
- The avoiding of induction of allergic is taken in team consideration in addition of adverse drug reaction for which the patient is known to be at significant risk.
- The team use different methods to minimize the risk for surgical site infection.
- The team should be avoided inadvertent retention of sponges and instruments in surgical wounds.
- All surgical specimens must be identify and secure by the team.
- Communicate and exchange critical information among team for the safe conduct of the operation.
- Public health systems and hospital establish routine surveillance of surgical capacity, volume and results.

The introduction of this checklist should not take more than two to three minutes.

The anesthetic assistant in can do the first step of the checklist. The operating surgeon can do the second step or the surgeon or the anesthetic assistant can do the 'time out' prior the start of the procedure and the final 'signing out' [10]. The health care-associated infection is happened in a patient attendances to hospital in whom the infection was absent or incubating at this time [11].

The infection which caused by different source known as "Surgical site infections" (SSI) are among commonest hospital infections which acquired it comprising 14-16% of inpatient infections, SSI is consequences conditions, especially for patients stay for 7 days in the hospital, the sources of infection included different factors like contamination by alimentary tract bacteria, dressings, and even drugs and injections, other patients, hospital environment, food, staff, and infected surgical instruments, [12]. Early giving antibiotics before and continue for another two doses incision can cut the risk of surgical site infection by 50% [13, 14].

Patients and Methods

Present investigations implemented as prospective study and collect data from 162 consecutively enrolled patients. The item of the WHO checklist in (Fig.1) was applied to all patients. These were done by the surgeon with collaboration of the anesthetist and nursing staff at the surgical theater at Al-Diwaneyah Teaching Hospital during the period from 1st. of February 2018 till 1st. of February 2019. The surgical interventions include elective cases and emergency cases.

Data collected regarding the age, sex and other clinical evaluation were already taken during preparation for surgery. The primary ends were the rate of complications, including surgical site infection, respiratory problems and death, during hospitalization and through the one month after the operation. The checklists used in this study were divided into three phases.

Phase I before the patient get anesthesia, Phase II before skin incision, Phase III before patient leaving the operative room. Thereafter we followed up the patients with the recording of the postoperative complications or running the patient through uneventful postoperative period or death.

Then we correlated the occurrence of the postoperative complications with each parameter above.

The results are shown in the form of tables where statistically described.

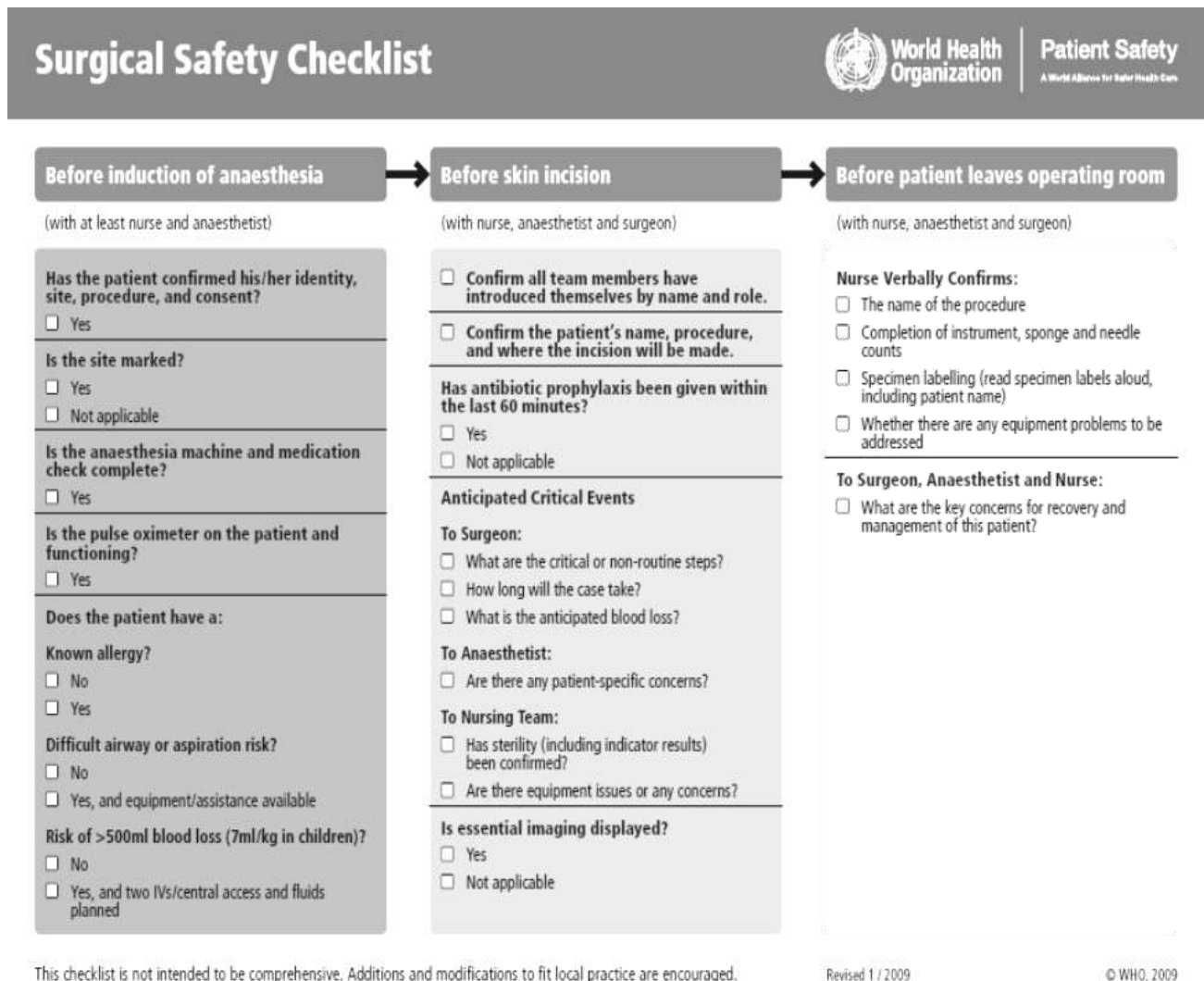


Fig. 1: WHO Surgical safety checklist

Results

The study included 162 enrolled patients submitted to elective and emergency operations and the checklist were applied to all patients in this study. In phase I before induction of anaesthesia (Table 1) the identity of the patient was checked in 161 (99.38%) patients, the site in 160 (98.76%) patients, type of procedure in 150 (92.59%) patients, and the consent in 152 (93.83%) patients.

The site for operation was marked in 106 (65.43%) patients. The pulse oximetry used in the finger of the patients in 150 (92.59%) patients. Anesthesia safety checked 155 (95.68%) patients. Allergy to drugs checked in 158 (97.53%) patients, 9 (5.56%) had drug allergy. Difficulty in airway checked in 158 (97.53%) patients, 2 (1.23%) of them had airway difficulty.

Risk of blood loss checked in 153 (94.44%) patients, of those 9 (5.56%) had risk of blood loss and preparation was done.

In the phase II, before skin incision (Table 2), the nurse confirms the name of the patients, site and the type of procedure in 161 (99.38%) patients. Anticipated critical events were the surgeon asked for how long the duration of operation or if there is risk of blood loss in 78 (48.15%) patients.

The anesthetist asked for any patient specific concern in 79 (48.76%) and the nursing team review in 16 (9.88%). Antibiotic prophylaxis given in 100 (61.73%) patients, and extended regime in 62 (38.27%) and the imaging displayed in 65 (40.12%) patients.

In the phase III before the patient leave the operative room (Table 3) the nurse verbally confirms the name of the procedure in 160 (98.76%) patients, instruments and gauze count in 120 (74.07%) patients, specimen labeled in 93 (57.41%) patients and equipment problems in 20 (12.34%) patients. The anesthetist concerns the recovery of the patients in 123 (75.92%) cases.

During the follow up period (Table 4), some patient had developed surgical site infection in 22 (13.58%). Of those patients 6(3.7%) received antibiotic prophylaxis, within one hour before operation and another two doses post operatively, and 16 (9.88%) continue on extended regime.

The number of patients with no wound infection and received extended regime was 46 (28.39%), and those who received antibiotic prophylactic with no infection 94 (58.02%). The P-value= 0.0003 which is highly significant using chi square test at 0.05 level of significant for those group.

Table 5 shows the complications occurred during and after completion of surgery, airway difficulties in 2 (1.23%), respiratory infection occurs in 4 (2.47%) patients. 3 (1.85%) patients need blood transfusion postoperatively, surgical site infection in 22 (13.58 %) and missed gauze happened in 1 (0.62%)

Table 6 show the characteristic of the procedure with respect to the outcomes and the regime of the antibiotic we found in 49 (30.25%) of emergency patients, the SSI in 15 (9.26%), antibiotic prophylaxis in 20 (12.35%), the extended regime in 29 (17.9%) and pneumonia in 1(0.62%) cases. In 113 (69.75%) of the elective cases we found SSI in 7 (4.32%) cases, antibiotic prophylaxis 80 (49.38%). extended regime of antibiotic in 33(20.37%), airway difficulties in 2 (1.23%) and respiratory complications in 3 (1.85%). No mortality occurs in both groups. The outpatient procedures 4 (2.4%) of patients and those excluded from the study.

Table 1: Number of patients checked before induction of anesthesia (N = 162)

| Parameters | No. of patients checked | % |
|--------------------------|-------------------------|-------|
| Identity | 161 | 99.38 |
| Site | 160 | 98.76 |
| Consent | 152 | 93.83 |
| Procedure | 150 | 92.59 |
| Site marked | 106 | 65.43 |
| Pulse oximeter | 150 | 92.59 |
| Anaesthetic safety check | 155 | 95.68 |
| Drug allergy | 158 | 97.53 |
| Airway difficulty | 158 | 97.53 |
| Risk of blood loss | 153 | 94.44 |

Table 2: Number of patients checked before skin incision (N =162)

| Parameters | No. of patients | % |
|-----------------------------|-----------------|--------------|
| Nurse confirmation | 161 | 99.38 |
| Anticipated critical events | Surgeon | 78 |
| | Anesthetist | 79 |
| | Nurse | 16 |
| Antibiotic prophylaxis | 100 | 61.73 |
| Imaging displayed | 65 | 40.12 |

Table 3: Number of patients checked before patient leaving the operative room (N=162)

| Parameters | No. of patients | % |
|---------------------------------------|-----------------|-------|
| Name of procedure | 160 | 98.76 |
| Instruments count | 120 | 74.07 |
| Specimen labeled | 93 | 57.41 |
| Equipment problem | 20 | 12.34 |
| Reviewing the recovery of the patient | 123 | 75.92 |

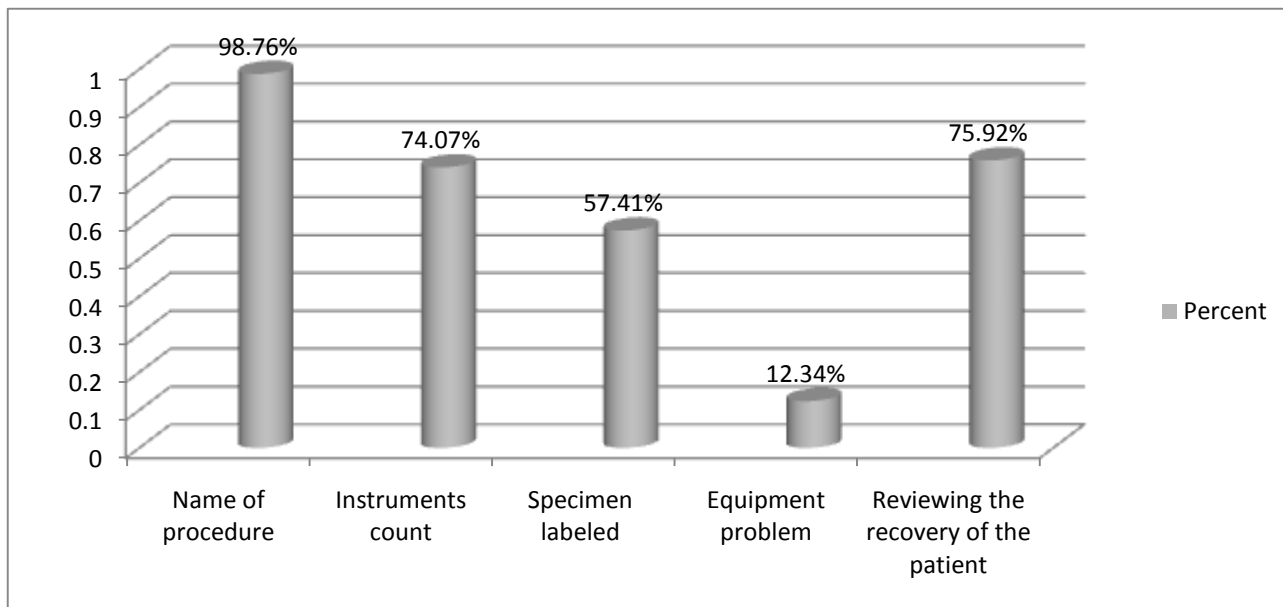


Fig 3: Number of patients checked before patients leaving the operative room (N=162)

Table 4: Relation of SSI to the prophylactic antibiotic or to extended regime (N =162)

| Parameter | Antibiotic prophylaxis | Extended regime |
|-------------------------|------------------------|-----------------|
| Surgical site infection | 6 (3.7%) | 16 (9.88%) |
| No infection | 94 (58.02%) | 46 (28.39%) |
| Total number | 100 (61.73%) | 62 (38.27%) |

P- Value =0.0003(highly significant) using chi square test at 0.05 level of significant

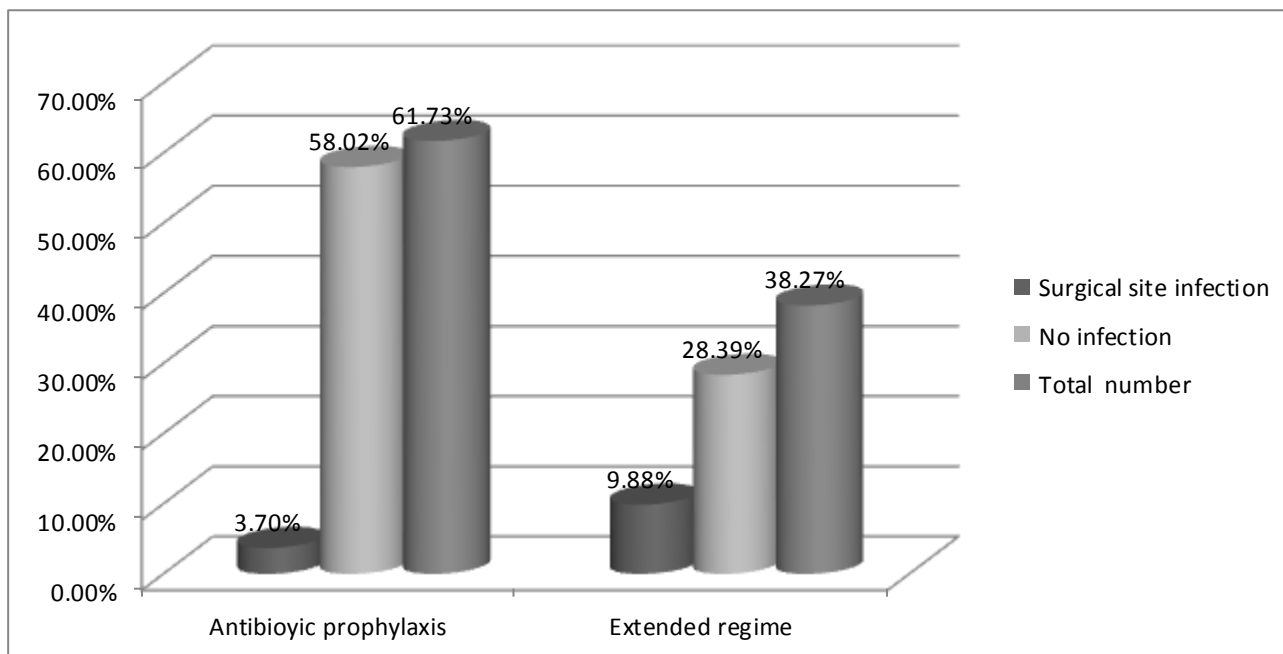


Fig 4: Relation of SSI to the prophylactic antibiotic or to extended regime (N =162)

Table 5: Complications during and after completion of surgery (N =162)

| Complications | No. of patients | % |
|---------------------------|-----------------|-------|
| Airway difficulty | 2 | 1.23 |
| Blood loss | 3 | 1.85 |
| Respiratory complications | 4 | 2.47 |
| Surgical site infection | 22 | 13.58 |
| Missed gauze | 1 | 0.62 |
| Death | 0 | 0 |

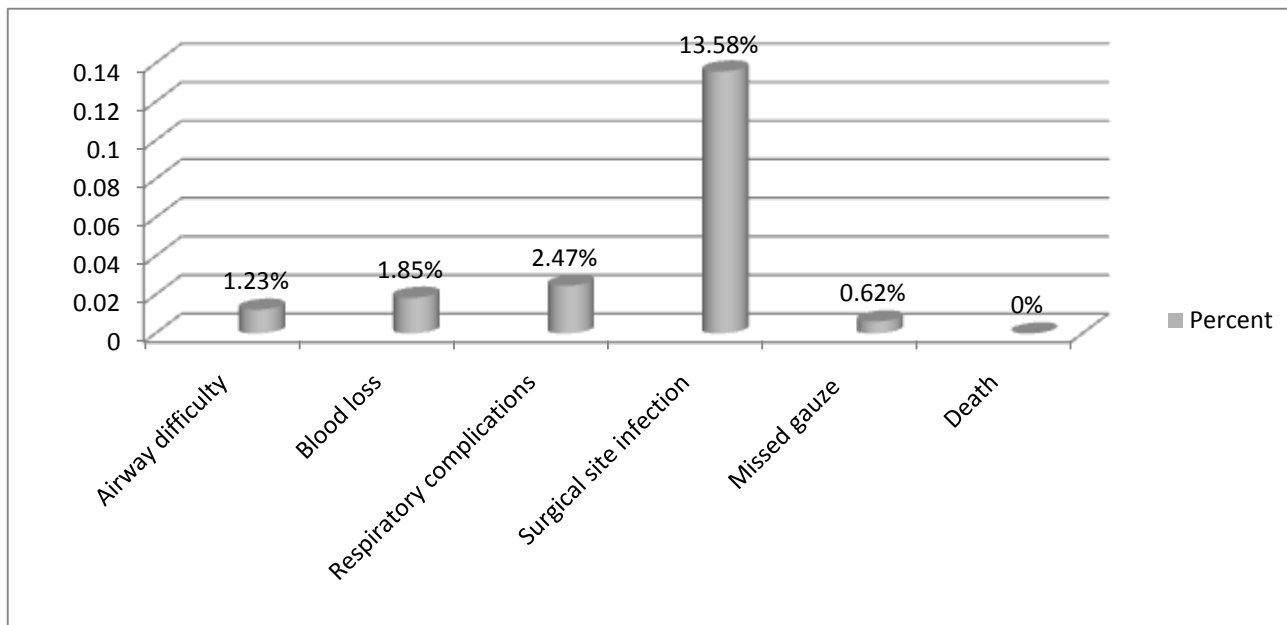
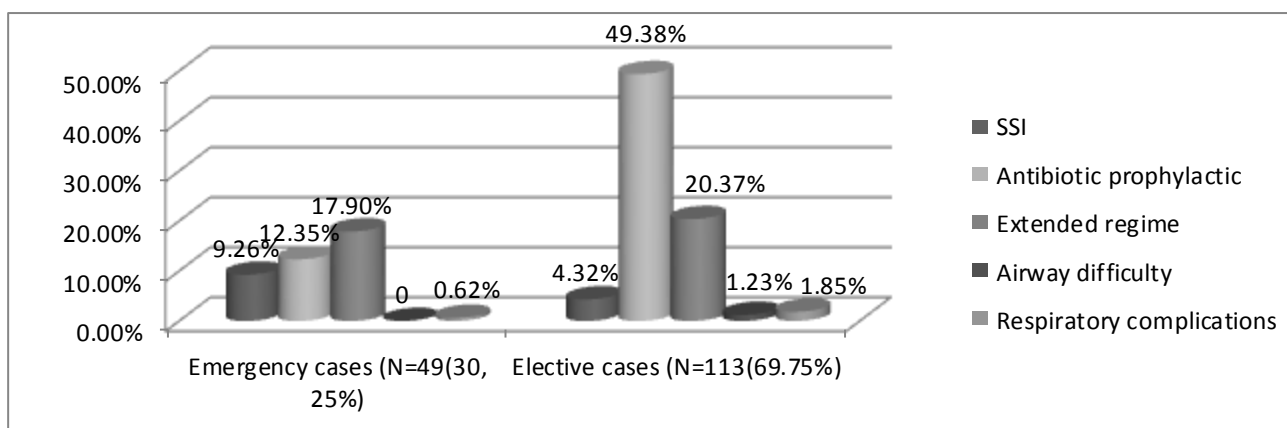


Fig 5: Complications during and after completion of surgery (N =162)

Table 6: Elective and emergency cases with respect to complications and regime of antibiotic. (N =162)

| Parameters | SSI | Antibiotic | | Airway difficulty | Respiratory complications |
|--------------------------------|------------|-------------|-----------------|-------------------|---------------------------|
| | | prophylaxis | Extended regime | | |
| Emergency cases (N=49(30, 25%) | 15 (9.26%) | 20 (12.35%) | 29 (17.9%) | 0 | 1 (0.62%) |
| Elective cases (N=113(69.75%) | 7 (4.32%) | 80 (49.38%) | 33 (20.37%) | 2 (1.23%) | 3 (1.85%) |
| p- value | 0.0001 | 0.0003 | | | 0.817 |



SSI: Surgical site infection

Discussion

Introduction of the WHO Surgical Safety Checklist into operating rooms in our hospital was comparable in surgical outcomes with Alex B. Haynes *ET al* [2]. Regarding the surgical site infection in our study it was 3.7%, which is nearly the same result in Alex B. Haynes *et al*, was 3.4%. This result was lower after the introduction of the prophylactic antibiotic comparing with result of study for SSI done in our hospital, which was 16.4% using extended antibiotic regime

[15], and this low result shows the effectiveness of giving antibiotic within one hour before skin incision with p- value 0.0003 which is highly significant using chi square test at 0.05 level of significant. In this study although not all the patients had marked the site of the surgery but there is no wrong site surgery during our collection of patients. This is attributed to the small sample and to verbally confirm of the site of the procedure,

while in the study done in UK they reviewed from Research and Learning System database (from September 2007 to August 2008) revealed 26 (3.6%) cases of wrong patients [16].

The development of pneumonia as a respiratory complication in this study occurred in 4 (2.47%) patients, 2 of these cases occur in patients developed respiratory embarrassment during the operation due to inadequately trained personnel, inappropriate preparation and lack of precise monitoring by anesthetist assistant, while in Haynes *et al* the risk was (1.3%), and in a study done by Syed Abdullah Iqbal et al shows respiratory tract infection in (7.0%) of patients [17].

In our study the gauze and instrument counting was only in 120 (74.07%) as the nurse count them just when there is open cavities, but one patient (0.62%) had missed gauze in subcutaneous tissue. In study done by Hyslop et al [18] there is one case of missed gauze in every 1000-1500 abdominal operations. There was no mortality in our study comparing with Haynes et al (0.8%), and in study done by Syed Abdullah Iqbal et al the mortality rate was (0.9%) [17]. In the outpatient procedures 4 (2.4%) patients there is limitation in collection of outcome data as it ceased on their discharge from the hospital

on the day of the procedure, so they not affect as much the rates of complications because of small in number.

In other studies the limitations of the study might affect on the underestimation of the number of deviations, because of increased diligence to ensure that everything went according to protocol [19]. This checklist program has the ability to prevent large numbers of deaths and complications, although more study needed to decide the mechanism and durability of the effect in specific setting.

Conclusions

Patient safety has comes in front in response to a high complication rate. We suggest that a lot of them are preventable. By applying the checklist we can prevent the wrong patients or wrong site procedure. We can save a life all over the world of about million and prevent the disability of the other patients. Checklists make more standardization in surgical procedures and avoid reliance on memory, decreasing the chances of human error.

Ethical Clearance

This study was approved by the ethical committee of ministry of health and environment in Iraq [20, 26].

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