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Factors affecting the safety of drains and catheters in surgical patients

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ABSTRACT

Objective: Drains and catheters are used for both prophylactic and therapeutic reasons in clinical practice. This study aimed to investigate the factors that affect safety of drains, catheters, nasogastric tube and central venous line in patients who underwent surgery.

Material and Methods: Two hundred and four consecutive patients who were operated at the general surgery clinics under general anesthesia were included in the study. Factors that affect the safety of drains and catheter were followed and recorded prospectively.

Results: During follow-up period, 12 (5.8%) patients have experienced problems regarding safety of drains/catheters. The mean age of patients who were followed-up in terms of security problems was 63.1 (39-86) years. Eight (66.7%) patients had been operated emergently, and four (33.3%) patients electively. Three (25%) patients had psychiatric/neurological co-morbidities and 3 (25%) patients were confused due to anesthesia/intensive care unit treatment when the drain safety was broken. Eight (66.7%) patients withdrew the drains or catheters by themselves, in 2 (16.7%) patients the drains spontaneously came out and in 2 (16.7%) patients the wrong drain was withdrawn. One patient had dementia, one patient had Alzheimer's disease and one patient was being followed-up with a diagnosis of schizophrenia. In three (25%) patients the abdominal drain, in four (33.3%) patients nasogastric tube, in one (8.3%) patient intubation tube, in one (8.3%) patient central venous catheter, and in three (25%) patients multiple drains were removed.

Conclusion: The inaccurate use of drains or re-intervention for an unintentionally removed drain causes problems regarding patient safety. Close monitoring of surgical patients in terms of security, and submission of additional measures for patients with confusion and neurological/psychiatric disorders are of great importance.

Key Words: Patient safety, drain, catheter, intensive care, delirium

INTRODUCTION

Factors affecting patient safety and problems related to it are widely reported in the media today, and it is also gaining importance in the academic literature. It has been reported that approximately 44,000 to 98,000 patients died as a result of medical errors in the United States in 1999 (1). There are studies stating that 11% of hospitalized patients have been affected by adverse events (2).

Drains and catheters are often used during surgical procedures (3). Drains are used for both prophylactic and therapeutic purposes. The most frequent reason for prophylactic use is to prevent accumulation of liquids such as blood, or lymphatic drainage and air within cavities after surgery (4). Therapeutic purposes include intraoperative or percutaneous abscess drainage. The surgical drain to be used is selected according to the process, requirements, features (active / passive pressure, open / closed) or construction material (silastic, rubber).

The drains and catheters used should not jeopardize patient safety. Many techniques have been proposed regarding drain safety, and methods for securing them to the skin (5, 6). This study aimed to investigate the factors that affect safety of drains, catheters, nasogastric tube and central venous line in patients who underwent surgery.

MATERIAL AND METHODS

Two hundred and four consecutive patients in the three-month period who were operated at the general surgery clinics under general anesthesia were included in the study. Patients were followed-up for factors that affect the safety of drains and catheters. After obtaining informed consent from patients who experienced problems, their data were prospectively recorded. Patients who were discharged without withdrawal of the drain or catheters were excluded from the study.

Statistical Analysis

Patient characteristics and evaluated factors were presented by descriptive statistics.

RESULTS

A problem was detected in terms of drain / catheter security in 12 of 204 patients (5.8%). The mean age of the patients who were followed-up after a security problem occured was 63.1 (39-86) years. Nine

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patients were male and three were female. Eight patients were operated for the liver / pancreatic / biliary systems, three for the stomach and one patient for the colon. Eight (66.7%) patients were operated emergently, and four (33.3%) electively. Nine patients underwent various resection, and three (25%) patients were treated with the application of a "Bogota bag". Three (25%) patients had cardiovascular comorbidities. The reasons for unplanned drain and catheter withdrawal are outlined in Figure 1. One patient was being followed-up with a diagnosis of dementia, one with Alzheimer's disease and one with schizophrenia. The distribution of affected drains and catheters are shown in Figure 2. The mean drain output for the last 24 hours was 377.5 (50-800) mL. A re-operation or medical intervention (percutaneous drainage or nasogastric application) was required in nine (75%) patients. There was a delay in discharge in eight (66.7%) patients.

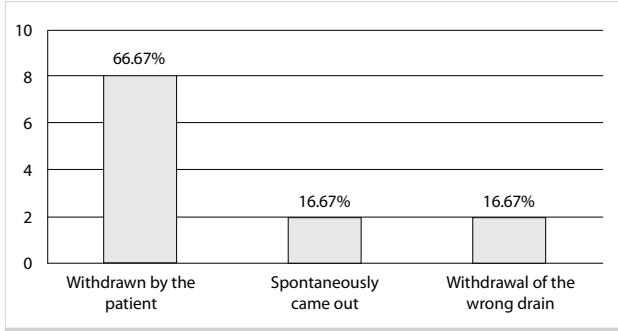

Figure 1. Unplanned drain and catheter withdrawal reasons

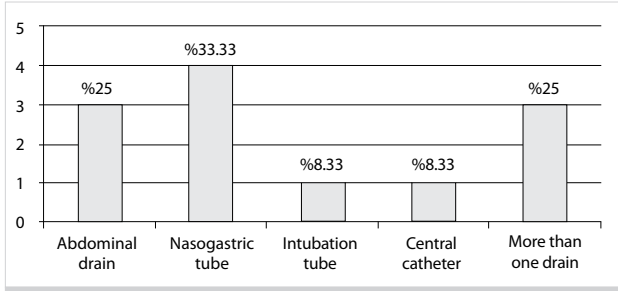

Figure 2. Type of affected drain and catheter

DISCUSSION

Surgical drain and catheter-related complications can occur. These include fragmentation of the drain in the abdomen, pain, infection, loss of function due to obstruction, perforation of visceral organs and probable problems regarding drain withdrawal (3, 4, 7, 8).

Unnecessary use of surgical drains, delays in the withdrawal of unnecessary drains, and failure to provide drain security during their use pose problems. Clinicians should pay attention to the safety of the drain especially in the early postoperative surgical patients and in patients with concomitant illnesses. Patients with drain safety problems are usually among those undergoing major surgery or in patients with complications. An increase in the time with catheters and drains increases the risk of potential complications (9). The most common cause of drain-related incidents was stated as psychological factors. Our patients who experienced problems were elderly. The withdrawal of more than one drain or catheter in three patients (25%) is a catastrophy in terms of treatment success, patient compliance and patient health. Delirium in elderly patients, especially in intensive care units, disrupts treatment compliance. Delirium is the impairment of brain function, especially consciousness, and disorientation due to various pathophysiological causes and is characterized by highly distorted behavior and acute mental status change (10). There are many underlying causes of delirium. Main predisposing factors include dementia, advanced age, audio / visual disorders, surgery, immobilization, medications and infection (10, 11). Delirium is overlooked by clinicians in 64-84% of patients (12). The elimination of factors that may lead to delirium and symptomatic therapy is recommended for treatment (10, 11, 13). Psychiatric disorders such as schizophrenia may lead to problems of drug interactions during anesthesia and surgery, confusion and treatment compliance (14). We believe the problems that occurred in three (25%) of our patients due to neurological / psychiatric co-morbidities can be prevented with a multidisciplinary approach.

7.5% of patients are affected by adverse events during acute hospital care and 37% of these incidents stem from preventable events (15). Withdrawal of the wrong drain by clinicians in two (16.7%) patients is an example. Surgical practices may cause irreversible consequences that affect patient safety. Surgical team training, the concept of patient safety, reporting / monitoring errors and learning from mistakes decrease medical errors (16, 17).

Withdrawal of the nasogastric catheter either by the patient or due to insufficient securing of the catheter may cause significant distress for most patients during clinical practice. However, loss of drain function leads to a major problem. Requirement of a repeat invasive intervention in nine (75%) patients is important. In addition, patients are facing the risk of morbidity related to these new procedures. The delayed discharge of eight (66.7%) patients shows the consequences of patient safety problems. The incorrect use of drains or re-intervention for non-functional/removed drains causes problems in terms of patient safety (18, 19).

Eight (66.7%) patients had been operated under emergency conditions. Emergency and elective surgery procedures have significant differences in terms of preoperative period (ASA classification), intraoperative applications (type of surgery and complexity), postoperative care (intensive care unit length of stay, postoperative need for mechanical ventilation), surgical complications and survival outcomes (20). The difficulties in diagnosis, treatment and follow-up of patients who undergoes emergency surgery also affect the safety of the used instruments.

There are potential limitations of the study related to its subject and planning. Whether the drains or catheters were spontaneously lost or the patient removed them was determined according to the patient's statement, raising an important issue. Similarly, there is a risk of failure to report or incomplete reporting by clinicians. These issues are even reported from other centers that use improved patient safety reporting systems (21).

CONCLUSION

Close monitoring of surgical patients in terms of security, and performance of additional measures for patients with confusion and neurological/psychiatric disorders are of great importance. Evaluation of larger groups of patients for the factors affecting patient safety, and analyzing patients by a multidisciplinary team of psychiatry, anesthesia and surgery departments are required.

Ethics Committee Approval: The study was observational and hence permission of the ethics committee is not required.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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