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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/16612

DOI URL: <http://dx.doi.org/10.21474/IJAR01/16612>



RESEARCH ARTICLE

ASSESSMENT OF POSTOPERATIVE ANAESTHETIC INCIDENTS IN THE RECOVERY ROOM

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Manuscript Info

Manuscript History

Received: 31 January 2023

Final Accepted: 28 February 2023

Published: March 2023

Abstract

The awakening period is a critical phase during which a large proportion of anesthetic accidents can occur. Following a therapeutic or diagnostic procedure performed under general, locoregional or sedation anesthesia, the patient is exposed to risks of complications related to the residual effects of the drugs administered, the consequences of the procedure performed, and patient's comorbidities.

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Introduction:-

The awakening period is a critical phase during which a large proportion of anesthetic accidents can occur. Following a therapeutic or diagnostic procedure performed under general, locoregional or sedation anesthesia, the patient is exposed to risks of complications related to the residual effects of the drugs administered, the consequences of the procedure performed, and patient's comorbidities.

Not only developed countries but developing countries have adopted a system to monitor and report anesthesia-related incidents (1). However, the incidence of occurrence and the nature of these complications remain poorly documented in our practice.

The aim of our work is to reveal the different incidents encountered in the recovery room, in order to evaluate the incidence of those accidents and to search for their favouring factors in order to prevent them.

Materials and Methods:-

This is a prospective descriptive analytical study conducted over a period of 16 months, from the beginning of January 2012 to the end of April 2013, at the recovery room of the BOC A2 at the university hospital of FEZ, covering 2000 procedures performed by three specialties (trauma-orthopedics, neurosurgery and ENT).

Our study included all patients who received anesthesia for scheduled surgery during this period and who met the following criteria: all patients admitted to the recovery room after general anesthesia, sedation or locoregional anesthesia in the A2 recovery room. Were excluded all the patients operated in emergency and those who did not stay in the recovery room such as : patients operated for heart surgeries and the patients who were transferred to an intensive care unit.

We recorded each incident, its category and patient outcome (recovery, cardiac arrest with recovery, or mortality). Patient demographics, American Society of Anesthesiologists (ASA) physical status score, and existing systemic disease were also noted. Surgery characteristics included its specialty and urgency (elective or emergency). Anesthesia information comprised of its type and supervision by consultants. Contextual information included the

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time of day and means of detection how the incident occurred. Some items were predefined such as : desaturation when arterial oxygen saturation was less than 90% and hypothermia when body temperature was less than 35°C. Cardiovascular incidents including bradycardia, tachycardia, arrhythmia, hypotension, and hypertension were defined based on whether corrective medications were administered and clinical significance as per anesthesia provider's decision.

Descriptive statistics were presented as median for reported patients' age and percentage for categorical variables. Sub-group comparisons were performed. Relative risks with 95% confidence interval were calculated for anesthesia type concerning the occurrence of incidents.

Results:-

In our study, 1078 patients, which represents 53.91% of the patients admitted to the recovery room were male. The average age of our patients was 46 years old. An ASA score of I was the most predominant, and it was found in 70% of cases. The majority of the surgeries performed concerned traumatology and orthopedics. In fact, these surgeries represented 54.06% of the surgeries performed at BOC A2 during that period. 12.58%, as to say, 251 of the patients presented a postoperative incident. ENT patients had the highest rate of incidents with 13.37%, followed by trauma and orthopedic patients with 11.96% and finally 11.76% for neurosurgery.

Concerning those incidents in the recovery room, postoperative pain was found in 34.46% of the patients, followed by neurological complications in 26.38% of them, hemodynamic complications in 17.87%, hypothermia in 16.17%, respiratory complications for 15.74%, nausea and vomiting for 9.78%, and urinary complications only in 1.27% of patients.

General anesthesia (GA) was responsible for 73.61% of complications, locoregional anesthesia for 16.59% and sedation for 9.78%. GA was most often responsible for postoperative pain, which accounted for 31.57% of complications, followed by neurological incidents in 24.9%, hemodynamic complications in 17.07% of cases, and 14.18% of respiratory complications. As for locoregional anesthesia, hypothermia and postoperative pain were the main manifestations with respectively 25.64% and 20.51%, followed by neurological complications in 17.94% of cases. Sedation was most often responsible for postoperative pain, in 27.43% of cases, followed by respiratory complications in 23.08% and neurological complications in 20.73%.

The most common respiratory complications are : postoperative hypoxemia which represents in our series 53,57% of respiratory complications, airway obstruction in 17.85%, and dyspnea was found in 14.28%.

Cardiovascular complications represented 17.87% of complications, which concerned 2.25% of all operated patients. The most frequent incident was tachycardia, which was 55.26% of all hemodynamic complications. It was mainly observed during surgeries carried out in emergency or which lasted more than 4 hours. Then there was arterial hypertension, representing 18.42% of cardiovascular complications. In our series, arterial hypotension concerned 13.15% of complications.

Neurological drawbacks represented 26.38% of postoperative complications. In our study, delayed awakening was accounted for 30.43% of postoperative neurological complications and was related either to the prolongation of the effects of anesthetic drugs, or to metabolic or neurological disorders per operative. In our study, agitation was the main manifestation with a rate of 69.56%. This agitation was often related either to an overdose of anaesthetic drugs or delayed elimination of the latter, or to the presence of postoperative pain which in this case all improved with analgesic treatment.

In our study, urinary complications represented only 1.27% of all complications and consisted of urinary retention, generally treated by bladder catheterization.

93% of the patients returned to their hospital wards, while 7% needed to be transferred to the A1 intensive care unit. Among those patients transferred to intensive care unit, 57% of them had undergone neurosurgery, 22% trauma surgery and 21% ENT surgery.

The main causes of admission to the ICU were : giving proper and multimodal postoperative analgesia, management of shock and arrhythmias, and close monitoring of postoperative complications for patients undergoing neurosurgery.

Discussion:-

Despite advances in techniques, medications, equipment, training modalities, and vigilance in care, anesthesia carries a risk of adverse patient outcomes. Although rare, this risk is still reducible. For this purpose, knowledge on the frequency of incident types, their underlying circumstances, and classes of errors at the particular set up is essential (2).

The epidemiological survey conducted by INSERM (National Institute of Health and Medical Research) in France between 1978 and 1982 showed that 42% of anesthesia accidents occurred during recovery. Indeed, a prospective study including 18473 patients admitted to the recovery room in a university hospital in France showed a complication rate of 23.7% (3). This matches with our study of 2000 cases which showed that 12.58% patients had a postoperative incident.

Several studies have shown that the incidence of postoperative complications varies with sex, age, obesity, smoking and nutritional status. Among the 60 serious respiratory accidents of the INSERM (National Institute of Health and Medical Research) survey, 45% concerned ASA I subjects. Their prognosis was serious because these complications led to death in nearly 30% of cases. Emergency surgery and higher ASA classes are already established as the most important predictors of perioperative risk (4, 5). Thus, ASA II, III, IV subjects are always better monitored by anesthesiologists than ASA I patients.

The incidence of anaesthetic complications in children is much more than in adults and sometimes with a severe outcome. Patients under one year of age, those with co-morbidities and posted for emergency surgery are at increased risk for morbidities. In fact, in children, respiratory complications are the most frequently observed complications. Most are related to non-specific bronchial hyperresponsiveness secondary to an infectious episode that persisted. Their severity is variable, ranging from minor spontaneously resolving desaturation to more serious problems (6). However, ENT surgery patients had the highest incident rate with 13.37%. This may be due to the frequency of general anesthesia and the manipulation of upper airways by surgeons in ENT surgery. In fact, in ENT and maxillofacial surgery, respiratory complications can be mechanical due to obstruction of the upper airways or functional due to swallowing disorders that favor inhalation.

According to Brooks and Brunn, abdominal and thoracic surgeries have a high rate of complications, about 10 to 20%, especially respiratory, compared to less than 5% for other surgeries. We encounter all types of respiratory complications : pneumopathies, bronchospasms leading to long stay in intensive care unit or even death (7). In neurosurgery, the risk of respiratory complications is much higher in patients with postoperative consciousness disorders (risk of inhalation) and in posterior fossa surgery (damages to the last cranial nerves).

Several prospective surveys of large cohorts of patients have estimated the risk of postoperative respiratory complications to be between 1.3% and 7% depending on the symptoms. Most problems were due to overdose or delayed elimination of anesthetic agents and could be resolved by placement of an oropharyngeal or nasopharyngeal cannula or by face mask ventilation. Reintubation was required in only 0.02 to 0.1% of cases. The risk factors depend on the anesthesia, the patient's comorbidities and the surgery. The fact that general anesthesia is the most prone to complications can be explained by the use of long-acting drugs, overdose or residual curarization (8, 9, 10, 11).

Our study found similar results to the prospective studies described above, with respiratory complications representing 15.74% of all complications. Laryngospasm is less frequent. It occurs more particularly in children at the time of awakening and extubation. Its incidence decreases if extubation is done under deep anesthesia or after complete awakening, and at the end of a deep inspiration.

Several studies have been done to evaluate the incidence of hemodynamic and cardiovascular complications and to determine their risk factors. In a French study, cardiovascular complications represented almost 50% of the complications identified. Another study by Hines showed that cardiovascular complications are half as frequent as respiratory complications, and their frequency increases with the ASA classification (12). The Canadian study by Rose et al showed that the incidence of cardiovascular events in the recovery room is 7.2% in adults and that hypotension is the most frequent complication with a rate of 2% (13).

In our series, we find less alarming results, cardiovascular complications represent 17.87% of the complications, that is to say a rate of 2.25% of all the operated patients, the most frequent incident was tachycardia. Rarer disorders were reported, but also more such as ventricular and atrial extrasystoles, atrial flutter and severe ventricular arrhythmias, myocardial ischemia, acute heart failure (14).

Postoperative neurological complications encompass very different clinical entities such as postoperative confusional syndromes or strokes with variable symptomatology and incidences (15, 16).

Postoperative pain varies according to the patient's condition. It is more pronounced in women, anxious patients with pre-operative pain or pre-existing sleep disorders, and according to the type of surgery and the anesthetic management. In 1994, a study was carried out in France which consisted of a survey carried out on a given day by external audit of 96 adult surgical departments in 23 university hospitals in Paris. The study included 473 patients who were interviewed 24 hours after surgery. 46% of patients had experienced severe or very severe pain postoperatively (3). Numerous studies have shown that a high percentage of patients had experienced pain postoperatively and that reflects the lack of management of postoperative pain. In fact, prescriptions for analgesics were fully followed in only 24% of cases (17, 18).

Postoperative nausea and vomiting, in addition to the discomfort they cause, can have potentially serious impact such as inhalation or compromise the surgical result. They are the first cause of hospitalization in outpatient surgery. The risk factors are: young age, women in a period of genital activity, anxious preoperative subjects, history of motion sickness, absence of smoking, diabetic gastroparesis, laparoscopic surgery, ENT surgery, ophthalmologic surgery (in particular strabismus) and certain anesthetics such as ketamine or etomidate increase the risk. Total intravenous anaesthesia (TIVA) with propofol seems to be the technique of general anaesthesia with the lowest incidence of PONV. The incidence is on average 20 to 30% of all complications, in our study this incidence is relatively low, it represents only 9.78% of postoperative complications. Our lower rate of PONV could be explained by the wide use of propofol as an induction drug and the good preoperative preparation of the patients (19, 20).

Conclusion:-

The recovery room is an extremely important area that requires considerable support from an institutional viewpoint. Dealing with a wide cross-section of surgical procedures and other activities, it has a crucial position in the safe and efficient running of an operating suite. Furthermore, recovery area staff are frequently relied upon to provide an immediate extension of the anaesthetist's role, and must be skilled in airway management, cardiovascular manipulation and drug delivery. This comes about by ensuring comprehensive training specific to the area and encouraging ongoing education.

Correct administration in the early postoperative phase is decisive in the final outcome of surgery and the presence of the recovery room contributes significantly to a reduction in the post-operative risk rate. The objectives are: removal of the pharmacological effect of general anaesthesia; stabilization of vital parameters; stabilization of body temperature; control of the hydro-electrolytic balance; intensive intervention in the case of an acute complication; prescribing a suitable postoperative analgesia; recovering movement in the case of loco-regional anaesthesia.

However, the function, usefulness and importance of those recovery rooms must not replace the Intensive Care Units. In fact, there is evidence that recovery areas will come under increasing pressure to act as intermediate care facilities.

On the other hand, our study points to the fact that improved awareness of the relevance of postoperative incidents can improve the safety of anesthetic practice. Thus, anesthetic incident reporting should be introduced in all anaesthesia departments as part of quality assurance programs to ensure improved patient care, as an educational tool but never as a punitive measure.

Conflicts of interests:-

The authors declare no conflicts of interest in any kind.

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