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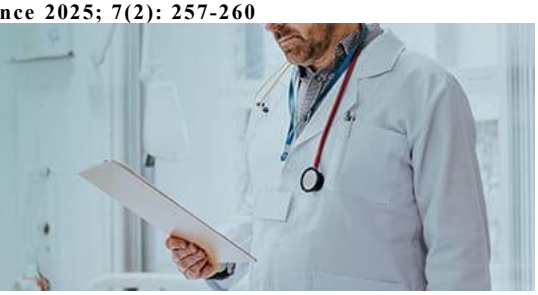

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Post-anesthetic complications in PACU of non-diabetic patients who exhibited hyperglycemia in the preoperative period

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Abstract
High levels of glucose are associated with an increase in perioperative mortality. There is a large amount of evidence indicating a correlation between elevated blood glucose levels during the perioperative period and inadequate clinical progression An observational, prospective, longitudinal, monocentric study was conducted. It took place at the General Hospital of Zone 20 in Puebla from March 1, 2023, to February 29, 2024. Adult patients men and women who underwent scheduled surgeries in this hospital were included. A sample of 45 patients was collected with an average age of 53.82 years ±13.35 standard deviation; of which 31 were women representing 68.88% and 14 men representing 31.11%, of whom 8 had post-anesthetic complications in the post-anesthesia care unit; of which: 6.7% had hypotension, 4.4% presented postoperative tremors and airway obstruction, and 2.2% presented nausea and vomiting postoperatively. The post-anesthetic complications in the post-anesthesia care unit of non-diabetic patients who presented with hyperglycemia in the preoperative phase that were observed were hypotension, post-anesthetic tremor, airway obstruction, and postoperative nausea and vomiting.

Keywords: Hyperglycemia, complications, post-anesthetic

Introduction
The responsibility of the specialist physician in anesthesiology involves the study and assessment of the patient, in order to indicate and provide the appropriate management and peri-anesthetic care for each situation [1].
Hyperglycemia is a metabolic disorder of multiple etiologies that affects most organs and systems. This condition can increase perioperative morbidity and mortality. Additionally, it is associated with adverse outcomes such as a higher incidence of nosocomial infections, as well as surgical wounds, catheter-related infections, urinary tract infections, and respiratory infections; it also presents with a higher incidence of thromboembolic and cardiovascular events, and longer hospital stays; therefore, its timely recognition and management favor better surgical outcomes [2].
Patients with hyperglycemia without a known diagnosis of diabetes may have a higher risk of perioperative morbidity and mortality than patients with known diabetes [4].
The likelihood of a specific complication arising for a given patient is determined by the nature of the procedure, the anesthetic techniques used, the patient's status, comorbidities, and preoperative medical assessment and optimization [11].
The recovery room of the operating room, also called the post-anesthesia care unit, is a specialized area in a hospital where intensive monitoring and care is provided to all patients immediately after surgery [12].
Each year, globally, there are 43 million adverse events related to healthcare, meaning that one in ten hospitalized patients will experience some type of adverse event.
According to the 2018 annual report from the Regional High Specialty Hospital of Bajío, the rate of adverse anesthetic events was 0.66%, with 72 incidents linked to anesthetic practice being detected. The most common adverse events are related to the respiratory system, medication, cardiac and neurological conditions; among the most common are: aspiration,

incorrect medication administration, hemorrhages, arrhythmias, and pain [17].

The complications that arise during the time the patient remains in the post-anesthesia recovery room represent a global indicator of the quality of anesthesiological care in each surgical center; therefore, studying these can lead to the implementation of guidelines or behaviors that result in better anesthetic-surgical outcomes and generate favorable feedback in the pursuit of excellence in care [17].

Materials and Methods

An observational, prospective, longitudinal, monocentric study was conducted. It took place at the General Hospital of Zone 20 in Puebla from March 1, 2023, to February 29, 2024. Adult patients, both men and women, who underwent scheduled surgeries in this unit were included.

A study was conducted on non-diabetic beneficiaries of the Mexican Institute of Social Security who were scheduled for surgery and experienced hyperglycemia in the preoperative period at the General Hospital of Zone 20 Puebla. Patients of any age group were included, scheduled for surgeries that experienced hyperglycemia in the preoperative period and had no prior diagnosis of diabetes. This was conducted after the protocol was approved by the Local Health Research Committee and until the results were collected from the case group. The sampling was consecutive, and all patients were monitored during their stay in the post-anesthetic care area, evaluating the presence or absence of post-anesthetic complications. The results were expressed using descriptive statistics. The information collected in the Data Collection Instrument was carried out for qualitative variables, which were presented by frequency and percentage; for quantitative variables, they were presented using measures of central tendency and dispersion. In the case that their distribution was normal or Gaussian, mean and standard deviation were used; in the case of non-normal or non-Gaussian distribution, median and interquartile range were used. For the data analysis, they were captured in a database created in Microsoft Excel 2022. The results were reported as descriptive data (mean, median, and standard deviation). Statistical analysis was conducted with the SPSS version 23 package.

Results

In this study, of the total sample of 45 patients, 31, equals to 68.9%, were women, and, 18 (40% of the total sample) work home duties (Table 1), which represents a higher influx of female population in health services and a direct relationship with greater availability of time due to not having a fixed work schedule.

From the total study population, only 6 patients, which corresponds to 13.3%, have completed undergraduate studies, 57.8% report having completed primary or high school (secondary education), relating to the 46.7% of patients with a low socioeconomic level (Table 1).

In our study, only patients who presented hyperglycemia in the preoperative stage were registered, so the total sample had this condition. It is relevant to mention that only 12 patients (26.7%) did not present any added comorbidity, compared to 73.3% who reported one or more comorbidities (Table 2). This shows a direct relationship with the presence of postoperative complications, as of the 8 patients (17.8%) who faced postoperative complications, 5 had one or more comorbidities, with hypertension and obesity being reported either as a single comorbidity or accompanied by another, occurring in 19 and 17 patients respectively (Table 3).

Table 1: Sociodemographic Factors

sociodemographic factors	frequency	percent
Gender		
Women	31	68.9
Men	14	31.1
Total	45	100
Marital Status		
Married	33	71.7
Common-Law Marriage	5	10.9
Single	4	8.7
Widower	3	6.5
Total	45	100
Socioeconomic Status		
Midddle	24	53.3
Low	21	46.7
Total	45	100
Education		
High School (Secundaria)	16	35.6
Elementary School	10	22.2
Bachelor's Degree	6	13.3
Carrera Tecnica	5	11.1
High School (Bacillerato)	5	11.1
High Chool (Preparatoria)	2	4.4
Incomplete Bachelor's Degree	1	2.2
Total	45	100
Occupation		
Housework	18	40
Bussinessman	4	8.9
Worker	3	6.7
Security Guard	3	6.7
Sales	3	6.7
Retired	2	4.4
Teacher	2	4.4
Driver	2	4.4
Maintenance	1	2.2
Waiter	1	2.2
Cleaning Staff	1	2.2
Kitchener	1	2.2
Logistics	1	2.2
Promoter´S	1	2.2
Employee	1	2.2
Laborstory Worker	1	2.2
Total	45	100

Table 2: Comorbidities.

Comorbidities.	Frequency	Percent
Whitout Comorbidities	12	26.7
Obesity	12	26.7
High Blood Pressure	10	22.2
High Blood Pressure, Obesity	4	8.9
High Blood Pressure, Depresion	1	2.2
High Blood Pressure, Hipothyroidism	1	2.2
High Blood Pressure, Heart Disease	1	2.2
Hipothyroidism	1	2.2
Lupus	1	2.2
High Blood Pressure, Reumatoid Arthritis	1	2.2
High Blood Pressure, Obesity, Reumatoid Arthritis	1	2.2
Total	45	100

Table 3: Post-Anesthetic Complications

Post-Anesthetic Complications	Frequency	Percent
Whitout Complications	37	82.2
Hypotension	3	6.7
Postanesthetic Shivering	2	4.4
Airway Obstruction	2	4.4
Nausea And Vomiing	1	2.2
Total	45	100

Discussion

Xiaojin Zhou *et al*.; Mexico; 2021 in a monocentric study analyzed 393 patients undergoing elective surgery and recorded their preoperative blood glucose levels, where 52.93% were women compared to 47.07% men, while in our study, 68.9% were women and 31.1% men.

Espinoza Quintero; Mexico 2017 [7] in an observational, descriptive, and retrospective study, with a sample of 309 patients undergoing a surgical/anesthetic procedure under general anesthesia with reported complications in the UCPA found an average age of 40.6 years, compared to our average of 53.82 years, of which 67.6% were women and 32.4% were men. In this study, 68.9% of women and 31.1% of men were reported, referring to respiratory complications in 13.9% of the sample compared to 4.2% in this study, nausea and vomiting in 7.4%, compared to 2.2% in this study, and cardiovascular alterations in 0.6% versus 6.7% in the present study.

The study should be elaborately discussed with the significance of the results with the help of earlier work and reports.

Fatma A Said *et al*. Tanzania 2022 [9] in a monocentric study with a sample of 430 patients with a mean age of 35 years compared to 53.82 years in our study; with 62.85% women, compared to 68.9% in this study and 32.2% men compared to 31.1% in this study, reported that 68.4% of patients had a postoperative complication compared to 17.8% in this study, of which: nausea and vomiting was the most frequent at 43.5% of reported cases, while in this study 2.2% of studied patients were reported, hypotension with 2.8% of studied patients compared to 6.7% in this study, and airway obstruction in 0.2% of cases compared to 4.4% reported in our study.

González Freijanes *et al*.; Cuba; 2021; [11] in a monocentric study with 191 patients undergoing cardiac surgery, where 60.7% were men, while in our study 31.1% were men and 39.3% were women, in comparison to our reports which show 68.9% of the studied population and an incidence of complications in 33.5% of their sample patients, against 17.8% in ours reporting an association between preoperative hyperglycemia and a greater number of complications.

Lone *et al*; India 2021 [12] in a prospective monocentric study with a sample of 220 patients where they reported major complications in general anesthesia for oral and maxillofacial surgery, with a female population that represented 55.9% compared to our sample where the female population was 68.9% and a male 44.1%, contrasting with the present study which reported 38.1% men, finding that the main complications were nausea in 67% of cases while in our study a prevalence of 2.2% was reported, hypotension in 29% of cases against 6.7% reported in this study, respiratory difficulty in 1% against 4.4% in our study.

Naeimeh Naeimi Bafgh and collaborators; Iran; 2023 (20) in an analytical, descriptive, and cross-sectional monocentric study with patients undergoing urological surgery, conducted a study on 123 patients where 74% were men, while in our study, 31.1% were men and 26% were women compared to 68.9% in this study, reporting post-anesthetic tremor in 5.7% of patients against 4.4% reported by our study, postoperative nausea and vomiting in 7.3% compared to 2.2% in our patients, hypotension in 0.8% compared to 6.7% in our results, and airway obstruction in 7.3% compared to 4.4% reported by us.

Conclusion

Post-anesthetic complications were found in 17.8% of the patients in this study sample, corresponding to hypotension in 3 patients (6.7%), post-anesthetic tremors in 2 patients (4.4%), airway obstruction in 2 patients (4.4%), and nausea and vomiting postoperatively in 1 patient (2.2%).

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