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The Impact of Regional Anesthesia on Open Heart Surgery: A Comprehensive Academic Assessment

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Abstract: Background: Open heart surgery can be significantly impacted by regional anesthesia. By effectively lowering pain before and following surgery, regional anesthesia can lessen the need of systemic painkillers and the possible negative consequences of such drugs. **Objective:** The present article delineates the impact of regional anaesthesia on the surgical outcomes of patients who have undergone open heart surgery. **Methods:** According to the data obtained from different hospitals in Iraq during the period between January 2023 and January 2024, we revealed the pathological parameters of 72 samples that underwent open heart surgery under regional anaesthesia. A general questionnaire was conducted in order to evaluate the patient's general health and quality of life, as well as to determine the side effects of regional anaesthesia on patients after open heart surgery. **Outcomes:** The present study enrolled the outcomes of 72 patients, with males constituting 80.56% of the sample and females 19.44%. The data revealed that 55.56% of patients were smokers, with coronary artery disease (40 cases) and heart valve disease (32 cases) being the most prevalent causes. The prevailing symptoms were shortness of breath (80.56%) and chest pain (75.0%), indicating a significant prevalence of respiratory distress in the patient population. Postoperative complications were observed in 22.22% of patients, including low cardiac output in three cases, sternal wound infection in three patients, and stroke in three patients. The in-hospital mortality rate was 3.33%. The mean postoperative hospital stay was 9.12 ± 2.55 days. The physical function of the patients was measured using the Short Form 36 (SF-36) health survey, with a mean score of 30.24 ± 5.78 before surgery, 66.21 ± 8.41 after CABG, and 71.22 ± 6.39. Following HVS, the pain levels were recorded at 36.32 ± 8.33 before surgery, 74.19 ± 5.01 after CABG, and 67.07 ± 4.80 after HVS. **Conclusion:** Regional anaesthesia is a great way to stop pain after open heart surgery. This helps patients to get better more quickly and feel better.

Keywords: Regional Anesthesia; Open Heart Surgery; Postoperative Pain; Recovery Time; and General Health Quality of Life Questionnaire (QOL).

1. INTRODUCTION

Since the 1980s, ambulatory surgery has undergone significant growth, with its share of total surgical procedures in the United States exceeding 60%. [1]

The prevailing contemporary trend has been towards outpatient surgery and abbreviated hospitalization. The advent of increasingly sophisticated techniques and equipment has enabled the performance of formerly hospital-based, invasive procedures in an outpatient setting. [2,3]

As with all surgical procedures, ambulatory surgical interventions necessitate the administration of anaesthesia, with the primary objectives encompassing a swift recovery, minimal adverse effects, effective postoperative pain management, early discharge, and cost reduction. [4,5,6]

From the perspective of anaesthesia, this poses several challenges. The advent of short-acting drugs has facilitated a swift postanesthetic recovery, while the refinement of postoperative analgesia using multimodal regimens has enabled patients to be discharged, thereby mitigating the risk of unanticipated readmissions. [7,8]

The simplicity and wide acceptance of general anaesthesia (GA) have resulted in its preeminence in these procedures. The introduction of novel fast-kinetic anesthetic agents, such as propofol or desflurane, has further solidified the position of GA as the technique of choice in many outpatient centres. [10,11]

Despite the clear benefits of outpatient surgical procedures, challenges persist in the management of postoperative nausea, vomiting, and pain [12]. A substantial body of research identifies these as the most feared complications by patients when undergoing surgery, and that in many cases, delaying discharge results in increased post-surgical complications and costs. [13]

In this context, anaesthesia and peripheral regional analgesia can be considered as potential alternatives, offering the advantage of highly specific analgesia, reduced reliance on general anaesthesia, reduced need for opioids to achieve adequate analgesia, and a reduction in associated side effects. [14]

A substantial body of research has demonstrated the efficacy of regional anaesthesia in reducing postoperative and post-discharge pain, decreasing the reliance on high doses of opioids to achieve adequate analgesia, and mitigating the adverse effects of these medications [15]. Furthermore, regional anaesthesia has been shown to reduce the incidence of nausea and vomiting, which, in the general surgical population, can range from 20% to 30% and up to 80% in high-risk patients. Finally, regional anaesthesia has been found to enhance patient satisfaction. [16]

Consequently, a growing number of anesthesiologists are opting to employ regional techniques as the preferred anesthetic modality, either as a standalone approach or in conjunction with other analgesic systems, to ensure optimal outcomes for patients undergoing outpatient surgical procedures. Recent reports indicate a twelvefold increase in the utilisation of AR over the past 16 years. [17]

2. METHODS

From January 2023 to January 2024, a total of 72 patients underwent open heart surgery in the Department of Thoracic and Cardiovascular Surgery at different hospitals in Iraq. All demographic characteristics were enrolled, including age, gender, smoking, medical history of illness, comorbid disease, and other data. The ages of patients who underwent surgery ranged between 40 and 80 years, with males constituting 60% of the sample and females 40%.

Vitality, usual role activities, social functioning associated with to illnesses, and limitations in physical functioning are among the eight components of health that are evaluated by the 36-item SF36 self-administered exam. It also includes a global evaluation of health. Each dimension is given a score on a range of 0 to 100, where higher scores indicate better health. Each item has between two and six possible responses. Two other summary scores that are generated to give a general picture of the patient's mental and physical well-being are the mental score (MCS) and the physical aspect score (PCS). One year following open heart surgery as well as the day before, angina pectoris and dyspnea are measured using self-administered questionnaires.

With regard to the intraoperative and postoperative data, it is evident that all patients have undergone open-heart surgery. The recorded variables include the types of surgery performed, operation time,

length of hospitalisation, admission to the intensive care unit, and postoperative pain and complications.

3. RESULTS

TABLE 1: BASICS CHARACTERISTICS OF PATIENTS.

CHARACTERISTICS	PARAMETERS	NUMBER OF PATIENTS, 72	%
AGE	YEARS		
	< 60	30	41.67%
	≥ 60	42	58.33%
SEX	M/F		
	Male	58	80.56%
	Female	14	19.44%
BMI	KG/M2		
	20.0 – 25.9	14	19.44%
	26.0 – 28.9	26	36.11%
	≥ 29.0	32	44.44%
SMOKING	YES/NO		
	Smokers	40	55.56%
	None	32	44.44%
PRIOR HEART OPERATION	YES/NO		
	Yes	5	6.94%
	No	67	93.06%
LEVEL OF EDUCATION			
	Primary	18	25.00%
	Secondary	45	62.50%
	Higher	9	12.50%
INCOME STATUS	DOLLAR, $		
	< 600	23	31.94%
	601 – 1000	34	47.22%
	> 1000	15	20.83%

TABLE 2: PREOPERATIVE CLINICAL OUTCOMES OF PATIENTS.

ITEMS	PARAMETERS	NUMBER OF PATIENTS, 72	%
SYMPTOMS			
	Chest pain	54	75.00%
	Shortness of breath	58	80.56%
	Fatigue	51	70.83%
	Swelling in the legs or abdomen	12	16.67%
	Irregular heartbeat	45	62.50%
	Difficulty sleeping	40	55.56%
CAUSES			
	Coronary artery disease	40	55.56%
	Heart valve disease	32	44.44%
COMORBID DISEASES			
	Yes	41	56.94%
	No	31	43.06%

	Hypertension	32	44.44%
	Diabetes mellitus	16	22.22%
	CPVD	12	16.67%
	Renal failure	1	1.39%
	Chronic obstructive pulmonary disease	7	9.72%
	Obesity	18	25.0%
FAMILY HISTORY			
	Yes	30	41.67%
	No	42	58.33%

TABLE 3: PREOPERATIVE CLINICAL MEASUREMENTS DATA.

ITEMS	PARAMETERS	NUMBER OF PATIENTS, 72	%
Angina			
	None	22	30.56%
	I – II	34	47.22%
	III – IV	16	22.22%
NYHA functional class			
	I–II	60	83.33%
	III–IV	12	16.67%
Ejection fraction			
	> 0.5	55	76.39%
	≤ 0.50	17	23.61%
Segmental wall motion			
	Normal	53	73.61%
	Abnormal	19	26.39%

TABLE 4: OPEN HEART OPERATIONS.

HEART OPERATION	NUMBER OF PATIENTS, 72	%
Coronary artery bypass graft	40	55.56%
Heart valve surgery	32	44.44%

TABLE 5: INTRAOPERATIVE AND POSTOPERATIVE DATA.

VARIABLES	CABG/HVS	
	N	%
Operation period, min	240.3 ± 53.2	
No. of bleeding		
Yes	8	11.11%
No	64	88.89%
Ventilation time, hours	21.26 ± 6.17	
ICU admission		
Yes	7	9.72%
No	65	90.28%
Hospital stays, days	9.12 ± 2.55	
Mortality rate		
Yes	3	4.17%
No	69	95.83%

Adverse outcomes	16	22.22%
Low cardiac output	3	4.17%
Reoperation for bleeding	1	1.39%
Intra-aortic balloon pump	1	1.39%
Pericardial effusion	2	2.78%
Mechanical ventilation 24 hours	3	4.17%
Sternal wound infection	3	4.17%
Stroke	3	4.17%

TABLE 6: QUALITY OF LIFE QUESTIONNAIRE SF 36 GENERAL HEALTH SCALE FOR PATIENTS.

ITEMS	All patient's prior surgery	CABG	HVS
Physical	30.24 ± 5.78	66.21 ± 8.41	71.22 ± 6.39
Pain	36.32 ± 8.33	74.19 ± 5.01	67.07 ± 4.80
Energy	40.28 ± 5.40	68.43 ± 2.20	65.54 ± 4.96
Mental	42.10 ± 1.02	75.55 ± 3.68	77.42 ± 3.25
Social	43.22 ± 2.39	72.16 ± 5.32	70.40 ± 3.88
General	48.78 ± 6.56	75.46 ± 3.21	78.89 ± 2.98

4. DISCUSSION

The majority of current studies [18,19,20] on quality of life in the field of cardiac surgery focus on elderly patients, critical care therapy, or coronary artery bypass grafting. Nevertheless, there is little information available to assist physicians in determining whether patients are most likely to have an improvement or deterioration in their general quality of life after open-heart operations (CABG and HVS). All but three of the SF36 scale's dimensions showed improvement when the mean preoperative as well as postoperative scores were compared. Following surgery, the quality of life improved for a majority of 55 percent of patients.

The two primary cardiac functional symptoms—dyspnea and angina pectoris—were also the subject of this investigation. These two factors may change during both the preoperative and postoperative phases, regardless of age or concomitant conditions. According to our research, a greater preoperative NYHA class is a predictor of a worse quality of life after surgery. It is reasonable to assume that the patients who experienced the most symptoms before to surgery would benefit the most in terms of their quality of life following a successful procedure. A higher NYHA class really denotes the more severe stage of the illness. [21,22]

A variety of patient groups have had their quality of life evaluated. It has been shown to be a predictor of 2-year survival following open heart procedures and mortality in 120 days following CABG surgery. The usefulness for preoperative QOL to be a predictor in cardiac function (physical limitation from angina and dyspnea) after heart surgery is still poorly understood, but it could help us better understand how a patient's preoperative health status affects the outcome of a particular medical episode. [23]

Four independent predicted variables—physical functioning, pain, general wellness, and CABG—were shown to have an impact on the 1-year cardiac function in our study following preoperative status adjustment. The fact that CABG was used as a separate variable for the analysis emphasizes how patients who need CABG or HVS behave differently. Compared to CABG patients, HVS patients recover more quickly. [24,25]

5. CONCLUSION

After surgery, regional anesthetic can effectively reduce pain, facilitating a more comfortable recovery for patients. Higher patient satisfaction ratings may result from improved pain management and fewer after-surgery issues. However, negative effects, including nerve damage, infection, or hematoma

development at the injection site, are linked to regional anesthetic. Furthermore, patients' quality of life is significantly enhanced by regional anesthetic because of improved recovery, which promotes both mental and physical growth.

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