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RESEARCH ARTICLE

ANESTHESIA FOR HYSTEROSCOPY: A COMPARISON OF GENERAL AND SPINAL ANESTHESIA

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Abstract

Introduction: Hysteroscopy is a commonly used surgical procedure; several anesthetic techniques are used. The objective of our study was to compare spinal anesthesia and general anesthesia with laryngeal mask for the realization of hysteroscopy.

Materiel and Methods: This is a prospective randomized study conducted in the operating theater of Mohamed V Instructional Hospital, including all patients classified ASA I and II, scheduled for hysteroscopy. Patients were randomized into two groups: spinal anesthesia (SA) and general anesthesia (GA) with laryngeal mask. The comparison between the two groups focused on the incidence of anesthesia-related side effects, satisfaction rate and length of stay in the recovery room.

Results: During the six months of the study (from July to December 2022), 76 patients were include. The incidence of hypotension was higher in the SA group than GA group (p = 0.024). Satisfaction of patients and surgeons was higher in the SA group (p = 0.04). The recovery room stay was shorter in the SA group compared with the GA group (p = 0.04). Patients preferred SA much more than GA (p = 0.001).

Conclusion: Several anesthetic techniques are available for performing hysteroscopy. Spinal anesthesia is easy to perform with lower cost and acceptable side effects with better satisfaction.

Introduction:-

Hysteroscopy is a main diagnostic and therapeutic tool for the management of endocavitarian benign uterine pathologies. It replaced the abdominal pathway by allowing less invasive surgery, without the risk of adhesions and with a postoperative morbidity markedly decreased [1]. Often performed as an outpatient, an adequate technique is always useful to ensure comfort for the patient and the surgeon. In the absence of consensus, anesthetic techniques for hysteroscopy range from local or loco-regional anesthesia to general anesthesia [2].

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The aim of our study is to compare the spinal anesthesia and general anesthesia with a laryngeal mask for the realization of hysteroscopy in terms of comfort, side effects and length of stay in the post interventional surveillance room.

Materiels And Methodes:-

It is a randomized, comparative prospective study conducted in Mohammed V Training Military Hospital in Rabat, Morocco, over a 6 month's period (from July to December 2022).

Were included all patients classified ASA 1 or 2 and programmed for diagnostic and/or therapeutic hysteroscopy. Were excluded all patients programmed for hysteroscopy before a hysterectomy and those with spinal anesthesia or laryngeal mask airway contraindication, or with difficult criteria for intubation and / or mask ventilation.

The patients were randomized into two groups: Spinal anesthesia group (39 patients) and general anesthesia group (37 patients).

Induction of general anesthesia (GA) was performed by: fentanyl (3 µg/kg), propofol (3,5 mg/kg). Maintenance of anesthesia was performed by sevoflurane (2 %) with an oxygen-air mixture (50%).

Spinal anesthesia (SA) was performed by a 27-gauge spinal needle by combining 10 mg of bupivacaine and 25 µg/kg of fentanyl.

The following data were collected: demographic characteristics, medical background, ASA physical status, the indication of surgery: diagnostic or therapeutic hysteroscopy, per and post-operative data as well as the anesthetic parameters for each group:

1. For patients in (SA) group: the level of puncture, hypotension, bradycardia, nausea, vomiting, headache, and possible use of ephedrine or anesthetic supplementation.
2. For the (GA) group by laryngeal mask: hypotension, bradycardia, nausea, vomiting wake-up time and the occurrence of adverse events.

Statistical analysis was performed using SPSS software version 23. We performed a descriptive analysis with quantitative variables expressed as mean ± standard deviations and qualitative variables as number and percentage. Differences in demographic characteristics and medical background between the two groups were assessed using Chi2 or Fisher test for qualitative variables or Student t tests or Mann- Whitney U tests for quantitative variables. The significance level was set at 95% ($P < 0.05$).

Results:-

During the duration of the study, 76 patients were included. The average age found in the study was 44.2 years in the general anesthesia group versus 42.06 years in the spine anesthesia group with a statistically non-significant difference ($p = 0.209$). The rest of the dermographic data is shown in Table 1.

The main indications of hysteroscopy in our study were polyps and myomas respectively, which accounted for 55.25% of the operated (Figure 1). The difference between the two groups in the surgical indications was not statistically significant ($p = 0.205$)

For the occurrence of low blood pressure, she was present in 8 patients in the RA group versus 4 patients in the GA group with a statistically significant difference ($p = 0.024$).

Patient satisfaction was more significant in the SA group. 26 patients were very satisfied, 10 satisfied and 03 dissatisfied in the SA group compared to 17, 12 and 08 patients respectively in the GA group, with a statistically significant difference ($P = 0.04$). Similarly for the satisfaction of the surgeon who was very satisfied in 22 cases, satisfied in 11 cases and indifferent in 06 cases for the **SA** group against respective values of 10, 20 and 07 for the GA group. The difference was statistically significant between the two groups ($p = 0.028$).

Table 2 objectives the various parameters assessed in our study.

Discussion:-

Hysteroscopy is a minimally invasive diagnostic and/or therapeutic technique often performed in outpatients for benign intrauterine pathologies (endometrial polyp, submucous fibroids, synema, endometrial hypertrophy, etc.). This procedure can be painful. Pain can occur during hysteroscopy and endometrial biopsy [3].

Several anesthetic techniques are used to ensure good comfort during hysteroscopy. The anesthetic choice depends on several imperatives: the ambulatory nature of the surgery, the safety and comfort of the patient, the early detection of complications including the massive resorption of the solute injected into the uterine cavity.

The effectiveness of the spinal anesthesia (SA) requires a blockage of the nerve roots from T10 to S4 (uterine innervation ranging from T10 to L1, and vaginal from S2 to S4). A small dose of hyperbaric bupivacaine 0.5% or isobaric ropivacaine 0.5% and an opioid (fentanyl or sufentanil) in order to reduce the dose of local anesthetics and have a prolonged post operative. It detects early neurological signs of glycoll intoxication. In addition this anesthetic technique is widespread and reaches a high degree of popularity due to the high success rate [4] associated with a low score of pain, and a high level of patient satisfaction [5].

In ambulatory surgery, the required dose of ropivacaine for T12 sensory block in 50% of patients (ED50) is 8.4 mg (95% CI: 7.2-9.7) versus 5.5 mg (95% CI 4.9- 6.1) for bupivacaine and 5.7 mg (95% CI: 4.9-6.4) for levobupivacaine [6]. A lower dose of ropivacaine (8 mg) reduced the recovery time compared with 8 mg bupivacaine (165 ± 45 min and 200 ± 50 min), but with an intraoperative failure rate of 16% [7]. The use of local short-acting anesthetics is an alternative for the development of SA in outpatient surgery with high efficiency. Chloroprocaine (2%) reduces the recovery time of L1 sensory block by 50% compared with 7.5 mg of hyperbaric bupivacaine; it also reduces the duration of the motor block by 43 min and allows an earlier ambulation of 40 min [8].

Adverse effects of SA may be manageable within the rules of spinal anesthesia in outpatient surgery. The incidence of nausea and vomiting is reduced by 66% with spinal anesthesia compared to general anesthesia [9]. A meta-analysis not specifically related to outpatient surgery had already shown a reduction in the risk of 74% post-spinal anesthesia headaches with an atraumatic needle, as well as with a small diameter needle [10]. Regarding the risk of urinary retention in post SA, Poing and al in their meta-analysis found that the addition of 20 to 50 µg of fentanyl does not increase the incidence of retention of urine, bringing the risk of retention of that observed after general anesthesia [11]. Pasquale Florio and al showed in their study regarding the interest of SA during hysteroscopy in a population of ASA III and IV patients, a high satisfaction rate with only one case of nausea and 4 cases of acute urine retention [12]. In the same study 93.5% of patients will prefer SA for a future intervention. In our study, the patient satisfaction rate for SA was 92.30% and that of surgeon at 84.61%. In addition, the length of stay in post-anaesthetic recovery room was greatly reduced with an average of 42.5 minutes compared to 95.6 minutes for the general anesthesia by a laryngeal mask and 74.35% of patients prefer SA for a future intervention.

General anesthesia (GA) is commonly used in surgical hysteroscopy; it requires short-acting drugs such as propofol and sufentanil. Maintenance with halogens such as sevoflurane or desflurane combined with nitric oxide. Target contolled infusiona (TCI) with propofol is an alternative to volatile anesthetics; it allows rapid recovery and reduces the incidence of postoperative nausea and vomiting. Airway control can be provided by a face mask or a laryngeal mask; tracheal intubation is necessary in obese people with gastro-esophageal reflux disease or extensive endometrial resection. It is also possible to make a sedation given the short duration of the gesture; several sedation procedures have been studied.

A comparative study between the combination of remifentanil-propofol and fentanyl-propofol, during hysteroscopy, was shown faster recovery time with remifentanil but the satisfaction rate was identical between the two groups [13]. Majholm B and al, reported in a comparative study between the paracervical block associated with remifentanil and remifentanil on TCI, a period of faster recovery and a high satisfaction rate in the patient group benefited local anesthesia associated with sedation with remifentanil [14]. In another study hysteroscopy induction and maintenance with sevoflurane and nitrogen monoxide enables faster recovery and less intraoperative hemodynamic instability compared to anesthesia with TCI and fentanyl [15]. In our study, the patient satisfaction rate was 78.37% for GA by laryngeal mask versus 92.30% for SA; with a wake-up rate of 53.18% minutes for the GA group.

Several solutions are used for uterine distension during hysteroscopy for correct visualization of the uterine cavity. Distension can be done by isotonic solutions (isotonic salt serum, lactate ringer) or hypotonic (glycine 1.5%, sorbitol 3%, mannitol 5%) [16]. The choice depends on the electrocoagulation equipment used. High absorption of hypotonic solutes may cause hypervolemia and water intoxication leading to hyponatremia, hypo osmolarity, cerebral and pulmonary edema, and in the most severe cases at death [17, 18, 19].

Several studies have been conducted comparing the impact of the type of anesthesia on the degree of absorption of uterine distension solutes. For example, a study by Meritxel Munmany et al showed that the use of inhaled sevoflurane is associated with a significant increase in glycine uptake 1.5% compared to propofol in TCI during hysteroscopy [20]. This can be explained by the vasodilatation induced by halogens leading to an increase in resorption. In the case of (SA), lack of relaxation of the abdominal muscles compared to (GA), reduces the passage of fluid through the fallopian tubes, and therefore reduces the absorption of liquid.

In a prospective randomized study, a high rate of 1.5% glycine uptake was demonstrated compared to local anesthesia associated with sedation [21]. Another study comparing the impact of spinal anesthesia and general anesthesia on the glycine uptake rate showed a high risk in the group of patients under general anesthesia with low blood serum sodium levels postoperatively [22].

A recent systematic review analyzing the use of ambulatory anesthesia for hysteroscopy concluded that the paracervical block is superior to other methods of local anesthesia [23]. This block was the most effective analgesia technique in the studies of Giorda et al. and Cicinelli et al. [24-25]. Lau et al wondered about the efficacy of para-cervical block since the injection is painful [26]. Their study demonstrated that para cervical block has not managed to avoid so significant pain associated with uterine distension, and concluded that its use in outpatient hysteroscopy is not justified. While Gabriele et al. showed in their comparative study between GA hysteroscopy with laryngeal mask and cervical paracervical block associated with conscious sedation, that it is effective in terms of pain control and involves a shorter operating time [27].

Topical anesthetics can also be applied in spray, gel and cream to the cervix. Unfortunately, no studies have proven their effectiveness until now [28,29].

Conclusion:-

Hysteroscopy is an essential diagnostic and therapeutic tool in the management of endocavitarian uterine pathologies. Several anesthetic techniques are available for the realization of hysteroscopy. The choice depends on the type of procedure, its duration, its complexity, the patient's terrain and the conventional or outpatient manner of hospitalization.

Spinal anesthesia in accordance with the rules of ambulatory anesthesia remains an easy anesthetic technique to achieve with acceptable side effects and a better satisfaction rate.

The current trend is to perform hysteroscopy especially diagnostic in outpatient and out-of-operating theatre. The challenge remains to use local short-acting anesthetics such as chloroprocaine, thus meeting these requirements especially with a reduced number of anaesthetists in the operating theatre.

Table I:- Demographic characteristics of patients.

	General anesthesia group (n=37)	**Spinal anesthesia group (n=39)**	**P**
Low blood pressure			
Yes	4	8	0.024
NO	33	31	
Patient satisfaction			
very satisfied			
satisfied	17	26	
no satisfied	12	10	0.04
	08	03	
surgeon satisfaction			
very satisfied	10	22	
satisfied	20	11	0.028
no satisfied	07	06	
average length of stay in SSPI (min) *	95,6 ± 17 ,3	42,5 ± 14,2	0.04
mean operating time (min)*	42,5 ± 14,2	37,27 ± 12,72	0.33
Wake up time (min)*	53,18 ± 26,38	-	-
Preference of anesthesia			
Spinal Anesthesia	11	29	<0.0001
General Anesthesia	26	10	

*: Mean ±SD

**ASA: American Society of Anesthesiologists

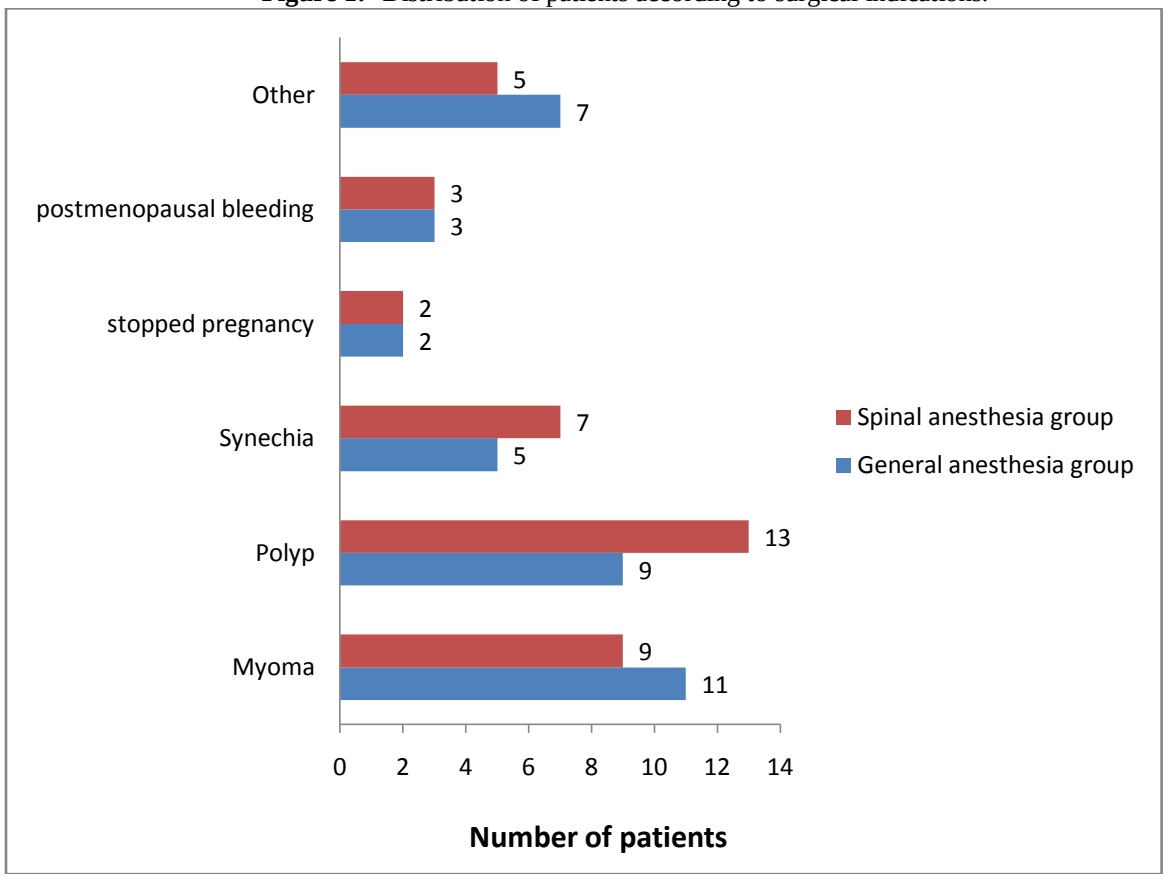
Table II:- The parameters evaluated in the study.

	General Anesthesia group	**Spinal Anesthesia Group**	**P**
Average age (years)*	44,2 ± 12,74	42,06 ± 10,42	0.209
Parity			
1	8	8	
2	16	12	0.609
3	7	15	
>3	6	4	
ASA score **			
I	24	32	0.12
II	13	7	

*: Mean ±SD

Liste of figures:

Figure 1:- Distribution of patients according to surgical indications.



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The authors declare that they have no competing interests.

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