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RESEARCH ARTICLE

COMPARISON BETWEEN PARAVERTEBRAL BLOCK VERSUS EPIDURAL IN PAIN MANAGEMENT OF THORACIC SURGERY.

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Key words:-

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Abstract

Introduction: Good management of postoperative pain in thoracic surgery is essential. This pain leads to inefficient ventilation. Good analgesia can provide effective pain relief. Paravertebral block is an effective alternative method without the side effects of a thoracic epidural. The aim of this study is to compare the efficiency of thoracic epidural and paravertebral block in providing analgesia to patients undergoing thoracic surgery.

Material and Methods: 30 patients who underwent thoracic surgery between January 2018 and May 2018 in Avicenne teaching Hospital (CHU Avicenne Rabat) were randomized into two groups. One was a thoracic epidural group (15), and second was a paravertebral group (15). Both groups received 10 ml of 0.125% bupivacaine. Assessment of pain, hemodynamic parameters such as blood pressure and heart rate, failure to cough or breathe, nausea and vomiting were taken into account. Visual analog scale of pain Intensity (VASPI) at H0, H12, and H24 scores were accepted as main outcome of this study.

Discussion: 18 patients (60%) were female, and 12 (40%) were male. 7 patients (23.3%) were among the age group (18-30), 13 patients (43.3%) were among the age group (31-60), and 10 patients (33.3%) were among the age group (61-90).

26(86.7%) patients underwent surgery using the thoracotomy technique, and 4 patients (13.3%) underwent surgery using the thoracoscopy technique.

63.3% of patients had a hospitalization (1 to 4 days), the rest (23.3%) had a hospitalization (4 to 7 days), and 13.3% had a hospitalization (more than 7 days).

We found that VASPI scores at H0, H12 and H24, as well as hemodynamic parameters related to pain were statistically lower in paravertebral block compared with the thoracic epidural ($P < 0.001$).

Conclusion: Paravertebral block for analgesia is more efficient than thoracic epidural in thoracic surgery patients, and is associated with fewer side effects.

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Introduction:-

Good management of postoperative pain in thoracic surgery is essential. This pain arises as a result of severe chest wall trauma including fractured ribs and damaged peripheral nerves and central nervous system hypersensitivity.[1]

Trauma, surgery or any infection in ICU is associated with release of cytokines, which contribute to the development of hemodynamic instability and metabolic derangement, which can worsen prognosis.⁶ Interleukin (IL)-6 is the most common cytokine shown to be associated with degree of tissue insult and hence can act as surrogate for intensity of tissue damage following trauma.⁷ The efficacy of utilizing different modalities for analgesia in controlling extent of tissue damage can be compared by measuring these cytokines levels.[2]

This pain leads to inefficient ventilation. Good analgesia can provide effective pain relief.

Epidural anesthesia is usually considered the gold standard for pain management. However, this method is not suitable for all patients and may be associated with dura mater perforation, bleeding, infection, hypotension, bradycardia, and urinary retention.[3]

Paravertebral block is an effective alternative method without the side effects of a thoracic epidural. The aim of this study is to compare the efficiency of thoracic epidural and paravertebral block in providing analgesia to patients undergoing thoracic surgery.

Material and Methods:-

This was a Prospective study including:

1. 30 patients who underwent thoracic surgery between January 2018 and may 2018 in Avicenne teaching Hospital (CHU Avicenne Rabat) who were randomized into two groups.
2. One was a thoracic epidural group (15), and second was a paravertebral group (15).
3. Paravertebral block patients received 10 ml of 0.125% bupivacaine. In T4 vertebral space
4. Epidural patients received 10 ml of 0.125% bupivacaine in T7 vertebral space.
5. Visual analog scale of pain Intensity (VASPI) at H0, H12, and H24 scores were accepted as a main outcome of this study.
6. Software used is spss 25.

Results :-

1. The results of descriptive analysis showed. For patient gender percentages: 18 patients (60%) were female, and 12 (40%) were male.
2. For group ages percentages. 7 patients (23.3%) were among the age group (18-30), 13 patients (43.3%) were among the age group (31-60), and 10 patients (33.3%) were among the age group (61-90).
3. 26(86.7%) patients underwent surgery using the thoracotomy technique, and 4 patients (13.3%) underwent surgery using the thoracoscopy technique.
4. The results of the evaluation of pain at H0 found that 7 patients (46.7%) that received paravertebral block had no pain, and none of the patients that received epidural had no pain at H0
5. The results of the evaluation of pain at H12 found that 8 patients (53.3%) that received paravertebral block had no pain, compared to only one patient (6.7%) who received epidural had no pain
6. Finally the results of the evaluation of pain at H24, found that 12 patients (80.0%) who received paravertebral block had no pain, compared to 3 patients only (20%) who received epidural had no pain
7. We also found that the evaluation of pain results in H0 H12 H24 was statistically significant $P < 0.001$

Frequencies

Table 1:-Table of patient's ages

N(%)	VARIABLES	N (%)
	Age between 18-30	7(23.3)
	Age between 31-60	13(43.3)
	Age between 61-90	10(33.3)

Table 2:-Table of patient's gender

N(%)	Variables	N(%)
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	female	18(60.0)
	male	12(40.0)

Table 3:-Technique

Variables	N(%)
thoracotomy	26(86.7)
thoracoscopy	4(13.3)

Figure1:-Evaluation of pain at H0

Variables	Epidural	Paravertebral block
Evaluation of pain at H0		
No pain	0(0.0)	7(46.7)
Between 1 et 2	1(6.7)	6(40.0)
Between 3 et 5	8(53.3)	2(13.3)
Between 6 et 8	6(40.0)	0(0.0)

Figure2:-Evaluation of pain at H12

Variables	Epidural	Paravertebral block
Evaluation of pain at H12		
No pain	1(6.7)	8(53.3)
Between 1 et 2	4(26.7)	7(46.7)
Between 3 et 5	8(53.3)	0(0.0)
Between 6 et 8	2(13.3)	0(0.0)

Figure3 :Evaluation of pain at H24

Variables	Epidural	paravertebral block
Evaluation of pain at H24		
No pain	3(20.0)	12(80.0)
Between 1 et 2	5(33.3)	3(20.0)
Between 3 et 5	6(40.0)	0(0.0)
Between 6 et 8	1(6.7)	0(0.0)

Figure4:-Heart rate at H0

Variables	Epidural	Paravertebral block	P Value
Heart rate between 60 and 79 bpm	2(13.3)	10(66.7)	0.001
Heart rate between 80 and 99 bpm	10(66.7)	5(33.3)	
Heart rate between 100 and 120 bpm	3(20.0)	0(0.0)	

Figure5:-Heart rate at H12

Variables	Epidural	Paravertebral block	P Value
Heart rate between 60 and 79 bpm	3(20.0)	14(93.3)	0.001
Heart rate between 80 and 99 bpm	10(66.7)	1(6.7)	
Heart rate between 100 and 120 bpm	2(13.3)	0(0.0)	

Figure6:-Heart rate at H24

Variables	Epidural	paravertebral block	P Value
Heart rate between 60 and 79 bpm	3(20.0)	15(100.0)	0.001
Heart rate between 80 and 99 bpm	10(66.7)	0(0.0)	
Heart rate between 100 and 120 bpm	2(13.3)	0(0.0)	

Figure7:-Blood pressure at H0

Variables	Epidural	paravertebral block	P Value
Blood Pressure between 10/6 mmHg and 13/8 mmHg	3(20.0)	11(73.3)	0.001
Blood Pressure between 14/ 9 mmHg and 16/10 mmHg	9(60.0)	4(26.7)	
Blood Pressure equals or more than 17/11mmHg	3(20.0)	0(0.0)	

Figure8:-Blood pressure at H12

Variables	Epidural	paravertebral block	P Value
Blood Pressure between 10/6 mmHg and 13/8 mmHg	5(33.3)	15(100.0)	0.001
Blood Pressure between 14/ 9 mmHg and 16/10 mmHg	9(60.0)	0(0.0)	
Blood Pressure equals or more than 17/11mmHg	1(6.7)	0(0.0)	

Figure 9 :-Blood pressure at H24

Variables	Epidural	paravertebral block	P Value
Blood Pressure between 10/6 mmHg and 13/8 mmHg	11(73.3)	15(100.0)	0.001
Blood Pressure between 14/ 9 mmHg and 16/10 mmHg	4(26.7)	0(0.0)	
Blood Pressure equals or more than 17/11mmHg	0(0.0)	0(0.0)	

Discussion:-

We found in our study that VASPI scores at HO, H12 and H24, were statistically lower in paravertebral block compared with the thoracic epidural, and the difference was significant ($P < 0.001$).

However, a study conducted by Singh C. and al. (2016) found that Paravertebral block for analgesia is comparable to thoracic epidural in thoracic trauma patients.[4]

Another study by Biswas and al. in 2016 found that epidural was far superior to paraveterbral block in the pain management of thoracic surgery patients.[5]

We found that VASPI scores at HO, H12 and H24, were statistically lower in paravertebral block compared with the thoracic epidural, and the difference was significant ($P < 0.001$).

Paravertebral blocks can provide excellent intraoperative and postoperative analgesia conditions with less adverse effects and fewer contraindications .

A clinician may consider a paravertebral block over thoracic epidural analgesia in a patient for whom bilateral sympathectomy and subsequent hypotension would be detrimental, such as a patient with severe aortic stenosis. Similarly, a unique feature of PVB compared with thoracic epidural analgesia (TEA) is that it is relatively safe to perform on patients with marginal coagulation.[6]

According to the ASRA guidelines, in patients on antithrombotic or thrombolytic therapy the same precautions should be taken as when placing an epidural. If bleeding in the thoracic paravertebral space does occur in these patients, significant blood loss, rather than epidural hematoma and neurologic deficit, is the more likely complication [7].

Concerning the side effects, epidural analgesia was associated with a higher likelihood of urinary retention and hypotension in the postoperative period.[8]

Conclusion:-

Analgesia is an essential part of management of thoracic surgery. Thoracic epidural have been considered the gold standard of pain management in thoracic surgery.

In our study, we found that Paravertebral block for analgesia is more efficient than thoracic epidural in thoracic surgery patients, and is associated with fewer side effects.

Conflicts of interest

The authors do not declare any conflict of interest.

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