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A Comparative Study of Nerve Stimulator versus Ultrasound Guided Brachial Plexus Block [Supraclavicular]

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Abstract

A controlled prospective, randomised, double-blind research was done to see whether Ultrasound guided blocks for upper extremity surgeries were any more effective than nerve blocks using nerve stimulation two groups of forty patients in the age range of 18 to 60 years with the age spread including eighteen and sixty-year-old II and sixty-year-old individuals were created. epinephrine 0.5 percent will be administered with an ultrasound directed treatment of 1 ml under control,2 mL in the group of 20patients in In group A and nerve stimulation 1% with an unguided dosage of the Long-expanded Longocaine 0.5% using BUMT Inject will have 1ml under direction under the power of the dosage ofine In group A an untelevised dosage of 2% BUMT performed with guidanceto regional injections, accompanied by 15mls/ml and BUMT and toxic,septic, cardiac and neuromuscular illness, gestational and heptodean diseases, and hydronephelmic disorders, and both light and serious, were also people with neuropathy and epilepsy, both Neuclinaitglic/ kidney, pulmonary, and mild to moderate, and hepatic conditions with sepsisisis were ineligible Group Aneurodynium blocks were used in the treatment of Group A patients, while ultrasounds were used for nerve stimulation in Group B. This was done to keep the patient in a supine posture.

Keywords : brachial, Sepsis, Pregnancy, anaesthesia, supraclavicular and Ultrasound

1. Introduction

Pain is the most basic and essential component of our life. anxiety, tissue loss that a person might feel due to physical suffering or the International association describes physical and emotional pain as being present in addition to or potentially correlated with real or presumed tissue damage, respectively (1-3). There is no underestimating the pain, and thus underuse of it. In the late 1980s, regional anesthesia began to be recognized as a significant part of comprehensive anesthetic treatment. We believe that geographic blocks have made their mark in patient care, operating, and also in older

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adults, so it's now being used in the perioperative, the postoperative, and to help with pain control in various populations (4-5). A long-induced paralysis blocks do not have as much of a negative impact on the physiological functions as they do on stress response levels and cooperation with a polycythemia on a co- cooperative patient Intraoperative pain relief can be obtained using an adequately treated regional anesthetic may be sufficient, but post-surgical pain management must be taken into account (1). Viennese ophthalmologist Dr. Carl Koller, at the age of twenty years, has brought the regional approach to eye surgery to the medical industry. injecting a 1 to 3 milligrams of cocaine per day into the eyes of people who will be doing ophthalmic surgery para the 20th century to date (when these newer polyamide peptide drugs started to be developed) these ester amino ester-based anaesthetics were still used. Since they only last for a shorter period of time, and often have been shown to have an adverse effects on the general health, whole-body system, these drugs are seen as dispensable in today's modern medicine. It paved the way for the development of the synthesis of newer compounds such as the aminoamide derivatives. surgical operations are most often performed on the upper limb by using the cervical plexusotomy block rather than other methods. In 1889, William Stewart Halsted carried out the operation on himself for the first time as a private patient. He performed the neck phrenic nerve block on the nerves that run down the spine by placing a catheter in the spinal canal, bypassing the phrenic nerve (6-9). brachial plex using a percutaneous (with a wire introduced through the hollow of the arm) injections instead of an incision was first identified in 1911 by Hirhel. The expansion of his classic oneirchyody method (q.v.v. postchondral) was recorded by Kulenkampff in the same year as well as the following it concerned the brachial plex.

Winnie and Collins developed the subclavascular route in 1964, which is also known as the Winnie Procedure After Raj's discovery, the infraclavicular solution was adopted. The solution to axillary metastasis was first introduced by Accardo and Adriano in 1949. In the past, anatomical landmarks and nerve stimulation (tapping) have been used to shape local blocks. Unfortunately, blind blocks that are based on anatomical landmarks have a tendency to cause severe problems. The technique of stimulating nerves for blocks has been known for a long time to be a successful, even in medical procedures which were restricted to the smallest local areas. but neither provides enough, nor guarantees, a sufficient degree of nerve block (10-12). The results may be conjointly related to the possibility of injury to nerve structures by direct puncture. Block protection is further ensured by the ability to visualize the anatomical structures by ultrasound's outstanding placement of the ultrasound device. Unexpectedly, the use of ultrasound to position transtrical plexus brachial plexus blocks was first recorded by La Grange et al. in 1978 who relied on a Doppler flow-measuring device to probe the proximal brachial blood vessels was the following year. Ultrasoundia applied a sonography of administration in 1994, Stephan Kapral et al presented the first application of this method of regional

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anesthesia with sonography Somehow, however, nevertheless, improvements have been made since the previous decade. an ultrasonic guidance was used to compare suprasaillateral brachial injection versus direct epidural injection in this investigation, since surface anatomy can influence or confound pre-deep blockade of the brachial plexus. and neurostimulation"[(5)].

2. MATERIALS AND METHODS

AGE

TABLE 1:

Age (in years)	GROUP A	%	GROUP B	%	p-value
< 20	2	10	4	20	0.784
21 – 30	6	30	7	35	
31 – 40	4	20	3	15	
41 – 50	2	10	2	10	
51 – 60	6	30	4	20	
TOTAL	**20**	**100**	**20**	**100**	

Among the total cases, In Group A, 10% belong to the age group lesser than 20 years, 30% belong to 21 – 30 years, 20 % belong to 31 – 40 years and 10% belong to 41 – 50 years, 30% belong to 51 -65 years. Group B, 20% belong to the age group lesser than 20 years, 35% belong to the age group 21 – 30 years, 15% belong to the age group 31 – 40 years and 10% belong to 41 – 50 years, 20% belong to the age group 51-60 years.

It is significant from the above table that in both the groups the majority of the age group lies between 21 - 30 years.

There was no statistically significant difference found in age between the two groups. (paired t test applied, P Value $\geq$ 0.05).

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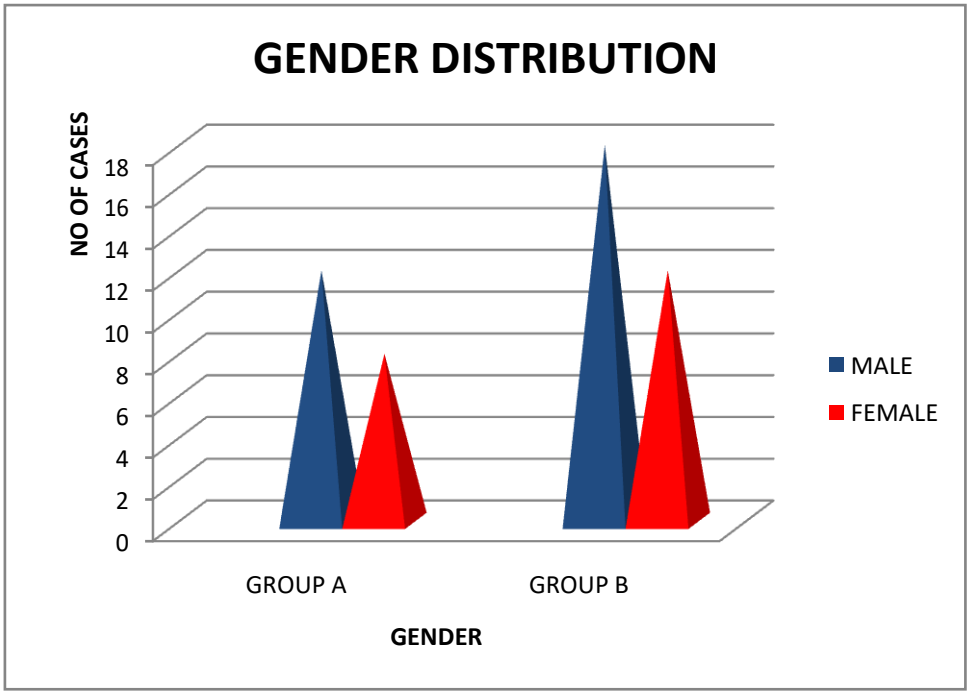
GENDER

TABLE 2:

GENDER	GROUP A	%	GROUP B	%	p-value
MALE	12	60	13	65	0.624
FEMALE	08	40	07	35	
TOTAL	**20**	**100**	**20**	**100**	

Among the total cases, in the Group A, the gender was distributed as 60% among males and 40% of females. The same with respect to Group B,the gender was distributed as 65% of males and 35 % of females.The gender distribution for both the groups shows a statistical insignificance as the P value > 0.05.



WEIGHT

TABLE 3:

WEIGHT (In kg)	GROUP A	%	GROUP B	%	p-value

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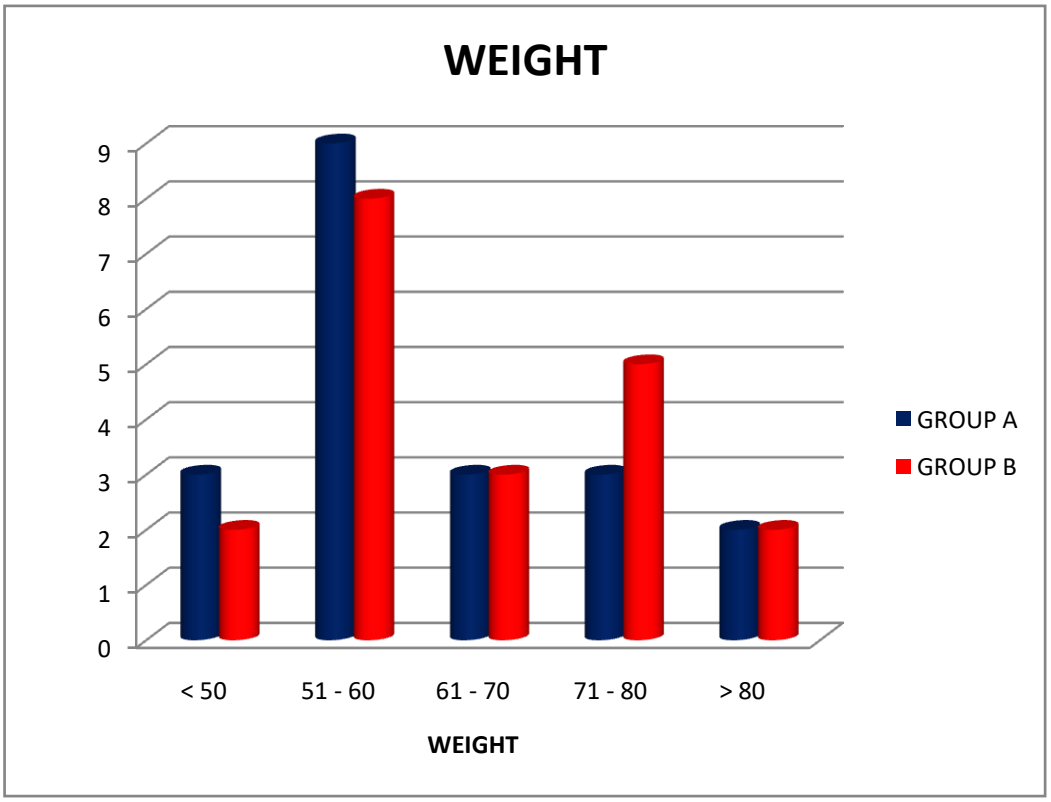
< 50	3	15	2	10	
51 – 60	9	45	8	40	
61 – 70	3	15	3	15	
71 – 80	3	15	5	25	0.562
>80	2	10	2	10	
TOTAL	**20**	**100**	**20**	**100**	

Among the total cases, In Group A, 15% belong to the weight lesser than 50 years, 45% belong to 51 – 60 kgs, 15% belong to 61 – 70kgs and 15 % belong to 71 – 80 kgs, 10 % belong to weight greater than 80 kgs. Group B, 10% belong to the weight lesser than 50 kgs,40% belong to the weight 51 – 60 years, 15% belong to weight 61 – 70 kgs and 25% belong to 71 – 80kgs, 10% belong to weight greater than 80kgs.It is significant from the above table that in both the groups the majority of the weight lies between 51 - 60kgs.

There was no statistically significant difference found in the weight between the two groups. (paired t test applied, P Value ≥ 0.05).



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BLOCK EXECUTION TIME IN MINUTES

TABLE 4:

BOE (in min)	GROUP A	%	GROUP B	%	p-value
4 min	8	40	0	0	0.002
5min	5	25	0	0	
6min	4	20	0	0	
7min	3	15	0	0	
8min	0	0	9	45	
9min	0	0	5	25	
10min	0	0	3	15	
11min	0	0	3	15	
TOTAL	**20**	**100**	**20**	**100**	
Mean	**5.1 minutes**		**9 minutes**		
S D	**1.42 minutes**		**0.85 minutes**		

NO, OF CASES

Among the total cases, In Group A, 40% belong to the 4min, 25% belong to 5min, 20 % belong to 6min, 15% belong to 7min, 0% belong to 8min,0% belong to 9min,0% belong to 10min,0% belong to 11min. Group B, 0% belong to the4min,0% belong to the 5min, 0% belong to the 6min, 0% belong to the 7min, 45% belong to the 8min, 25% belong to the 9min, 15% belong to the 10min, 15% belong to the 11min.

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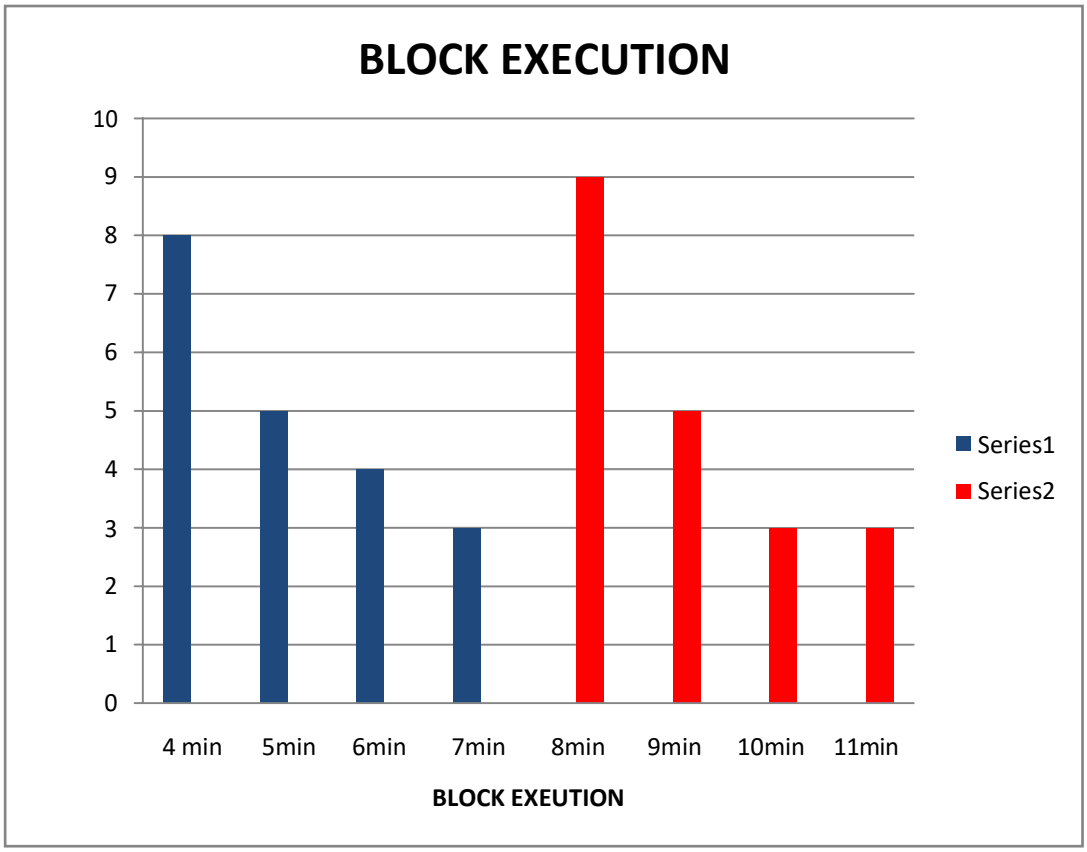
There was a statistically significant difference found in the block execution time between the two group s. (paired t test applied, P Value ≤ 0.05).



ONSET OF SENSORY BLOCK IN MINUTES

TABLE 5:

Onset (in min)	GROUP A	%	GROUP B	%	p-value
2 min	2	10	0	00	
3 min	6	30	0	00	
4 min	10	50	5	25	
5min	2	10	6	30	
6min	0	00	2	10	
7min	0	00	1	05	

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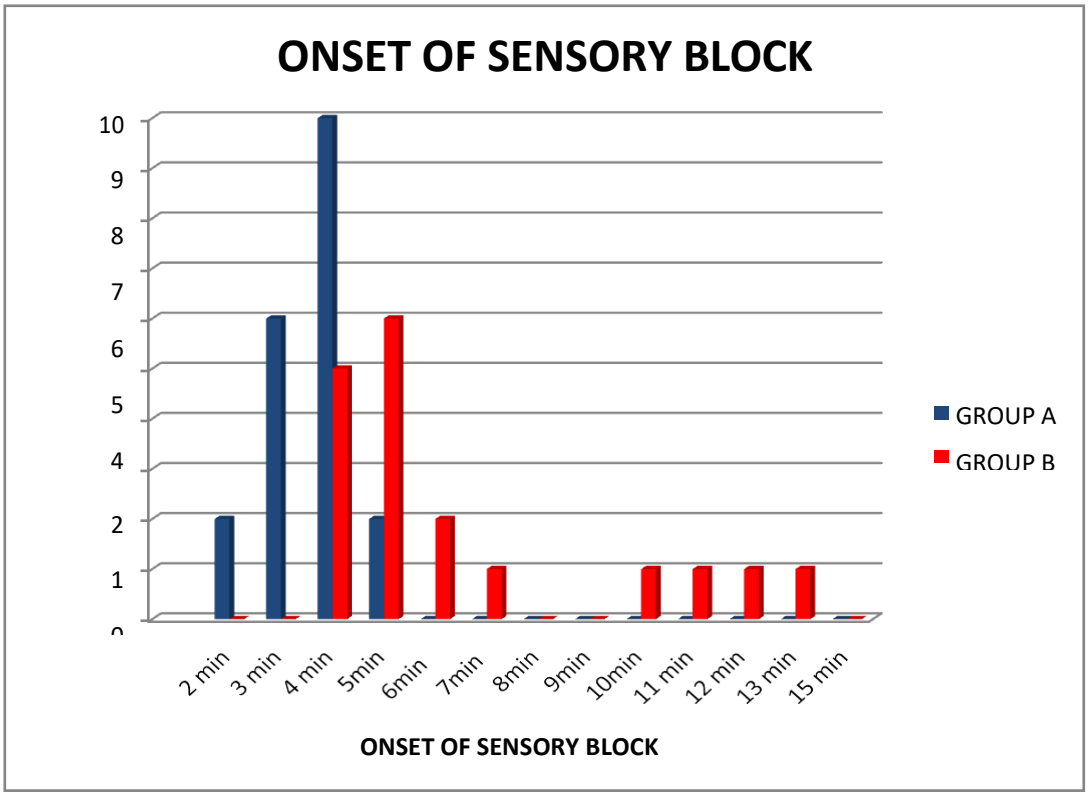
8min	0	00	0	00	
9min	0	00	0	00	
10min	0	00	1	05	0.032
11 min	0	00	1	05	
12 min	0	00	1	05	
13 min	0	00	1	05	
15 min	0	00	0	00	
TOTAL	**20**	**100**	**20**	**100**	
Mean	**3.6 minutes**		**6.1 minutes**		
S D	**0.21 minutes**		**0.93 minutes**		

Among the total cases, the mean onset of sensory block in Group A was 3.6 minutes and the same in Group B was 6.1 minutes.There was a statistically significant difference found in the onset of sensory block between the two groups. (paired t test applied, P Value ≤ 0.05).



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ONSET OF MOTOR BLOCK IN MINUTES

TABLE 6:

Onset (in min)	**GROUP A**	**%**	**GROUP B**	**%**	**p-value**
2 min	0	00	0	00	
3 min	0	00	0	00	
4 min	1	05	0	00	
5 min	6	30	0	00	
6 min	6	30	1	05	
7 min	4	20	2	10	
8 min	3	15	7	35	
9 min	0	00	5	25	
10 min	0	00	2	10	0.000
11 min	0	00	0	00	
13 min	0	00	0	00	
15 min	0	00	0	00	
17 min	0	00	1	05	
Nil	0	00	2	10	
TOTAL	**20**	**100**	**20**	**100**	
Mean	**6.1 minutes**		**8.77 minutes**		
S D	**0.57 minutes**		**0.39 minutes**		

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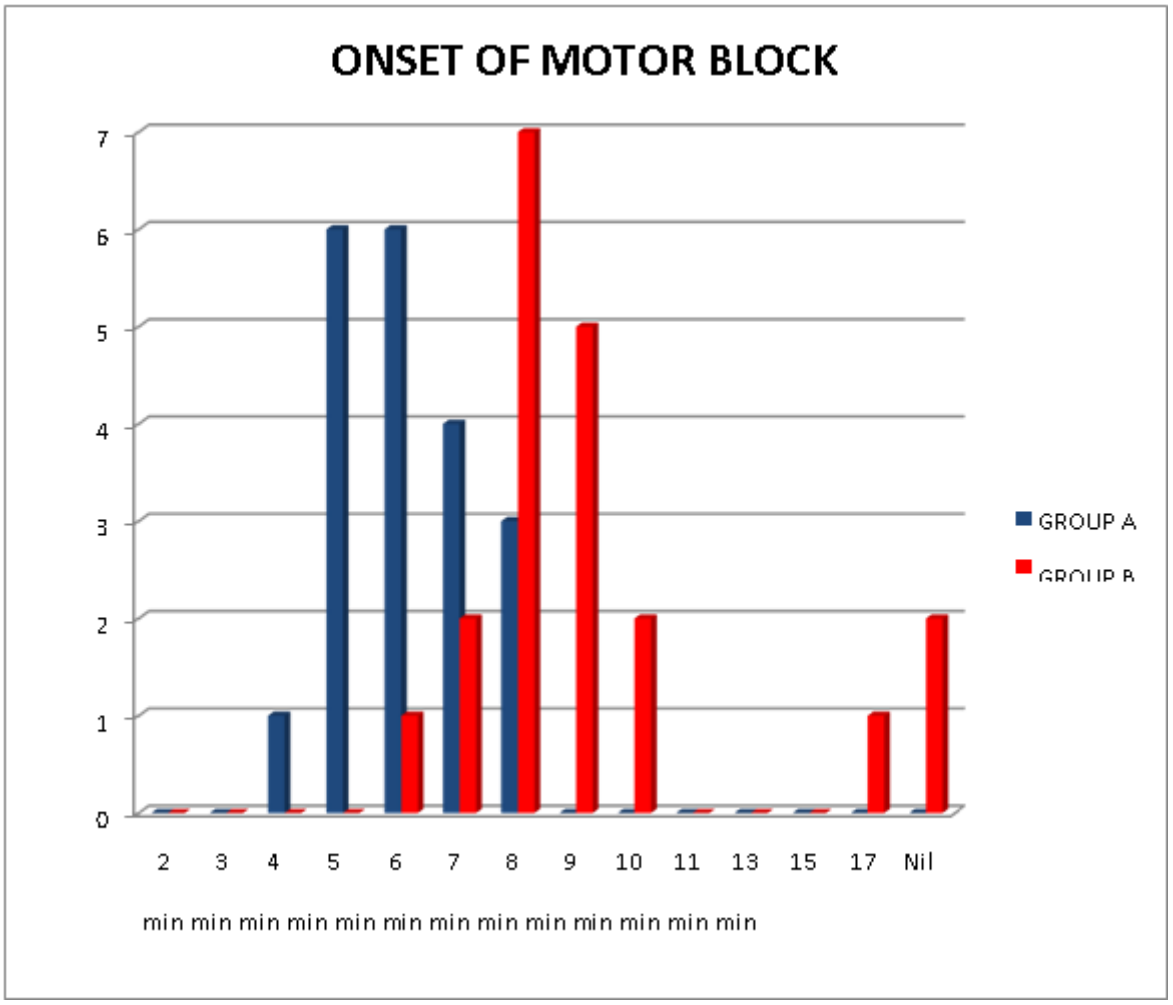
Among the total cases, the mean onset of motor block in Group A was 6.1 minutes and the same in Group B was 8.77 minutes.There was statistically significant difference found in the onset of motor block between the two groups. (paired t test applied, P Value ≤ 0.05).



NO OF NEEDLE ATTEMPTS

TABLE 7:

	Mean	S.D.	p-value
GROUP A	1.2	0.41	0.000
GROUP B	2.2	0.76	

The number of needle attempts was lesser in group A compared to the group B and the difference was

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statistically significant.

3. Results

Groups	Block execution time in minutes	Onset of sensory block in minutes	Onset of motor block in minutes	No of needle attempts
A	5.1	3.6	6.1	1.2
B	9	6.1	8.7	2.2

Ultrasound Group had shorter execution time (p = < 0.002) , faster onset of sensory block in minutes (p= < 0.032) , faster onset of motor block (p= < 0.000) , lesser number of needle attempts (p= < 0.000). On the whole study block failure was seen in 3 cases of Group B for which other modalities of anaesthesia was used to proceed with the procedure.

4. Discussion

In 1911, the application of the injection of a needle to the carotid in and around the left subclavian for blockade was developed by the Dutch doctor J.E.G.A. van Kulenkampf. measured as a significant. The benefits have to be taken into consideration alongside the risks of pneumothorrhosis (of extravasation) during the localisation of peripheral nerve trunks (13-15). The phenomenon of supracromiofematocyticosis, which has been revived due to the use of 2D ultrasound, has been applied to the visualization of the brachial plexus. pleural direct placement of the needles, reducing the chance of a pleural/subclavicular puncture and providing subclavical guidance prevents pneumothorrhythrophy from occurring (16-20). Over the past decade, there has been an incredible amount of advancement in both the science and techniques of sonography, and over that period, the applied knowledge of the technology has also expanded USG is also a commonly used as an an an an an elective procedure in many clinics. helps to increase the consistency and reduce the number of complications in patient care for patient catheterization by administering local anesthesin directly to the sensory nerves will help ensure enough analgesia and provide for excellent pain management for the patient (21). There are also benefits over traditional methods for it, but they're difficult to see at

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first. has shown encouraging results with regards to the efficiency of [suprachealvic and perineural]intral injection in that it found that USG advice would lead to substantial improvements in that particular category of patients [the ability to provide adequate injection and decrease the risk of intraneural and intravascular injection in this latter category of patients] Another group of research findings suggests that the use of ultrasonic guidance will result in many advantages over conventional techniques for nerve identification, including:

- Nerves and structural/ structural tissues (such as blood vessels, muscles, tendons) are easily repositioned after infusion, but indirect visual spread is impossible to guarantee.
- Avoidance of insertion of the solution unintentionally going in or around the intravascular and interventional catheters.
- sequestration of long- this or which may be done with the help of long-Preferred anesthetics can include using hypoallax-For lower back procedures,andotic blocks may be used in cases of myopathy to ease, or mitigate, the need for pain during nerve stimulators.
- appears to be smaller while a concentration of tricaine acetic acid is used
- less or greater sensitivity to visual, auditory, and olfactory information
- This has a longer block length of expansion
- →The improved consistency of the block
- Grehee and colleagues in the USG team have written two recent editorials on different uses of the application of US for the identification of nerve structures in regional anesthesia.

The weight of evidence from previous studies and findings supports the current study's conclusions

the present research is primarily geared towards determining whether superficial anesthesia is better than ultrasonic technique or electrocautery in treating a suprapleural blocks. Ultrasonic advice was expected to increase the proportion of blocks which would enable painless surgery, shorten the time of sensory and motor block, and cut down on complications. Two separate groups of 40 patients were chosen for the study, and given different treatment regimens. A fair when they were sized up in reference to age, sex, weight, and amount of time under anesthesia. It is important to keep in mind that

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the variations were statistically meaningful. The findings are important, at the very least, since the p value was greater than 0.05.

HYPOTHESIS MADE BEFORE STARTING THE STUDY

Hypothesis that was made before the present study was that THE BRACHIAL PLEXUS BLOCK given using USG guidance has a better study results when compared to blocks given using Nerve stimulation.

VOLUME OF DRUG USED:

Since the researchers Stephen R. Williams et al did an experiment on tensi lignation anesthesia, they found that the amount ofbuaine in the solution to be equal to 0.5% and 2% was administered with 200 ml is equivalent to a volume of 100 mg of epinephrine, which makes it good to two percent ligneous and 100 ml of volume hyperosmucilicone (1:200 ratio). According to a research study done by Vincent W.S. Chan et al, which used USG for supraclav, 20 ml of 2% lignocaine, along with 200 ml of 1:10,000,000 epinephrine, had an acceptable efficacy at enhancing visual and sphenopalatine block when administering 0.5% bupH2:20000mwin. the research focus was conducted on only the 2 percent of the anesthetic toxicity by administering the local anaesthetic at a dose of 0.5 percent of the minimum local anesthetic concentration (lumbar plexus) instead of the original 15 ml at 2 percent of the maximum anesthetic (spinal cord) volume (maximum spinal cord) found to be effective in the other studies (22-23).

BLOCK EXECUTION TIME:

When Williams et al. studied the efficacy of the combined use of USG and stimulation, the overall total duration of the intervention was slightly shorter (5.0 +/- 2.4 minutes) compared to stimulation (alone) (Expand). to an air expansion ratio of +3 (pounds per square inch of H2O2) and +0.5 for a manifold mixture pressure of 13.6 (psi) and negative manifold temperature of 65 (°F) requires 14.9 (13.5+/-6) pints of air and 1.74 (1.50+/-0.50) quarts of antifreeze to expand by 3 p.s.p.i.i.u. to 75F.m.p. to 13.6 to 1.75 by 0. at a manifold pressure of 13.6psi and a temperature of less than 65°F. Some additional studies have shown results that agree with the results of the present research (41,42). in this analysis, the difference between the Group A and Group B result is 3.7 minutes. That is, the study showed a 5.1 minute difference between Group A and the results (which were 3.7 longer) is important (24).

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NUMBER OF NEEDLE ATTEMPTS:

The number of needle attempts was 1.2 in group A and 2.2 in the group B. The difference is statistically significant. Various study shows that the use of ultrasound minimizes the number of needle attempts for nerve localization.

ONSET OF SENSORY BLOCKADE:

The onset of sensory blockade in group A was quicker (3.6 minutes) than B (6.1 min) and the difference is statistically significant.

ONSET OF MOTOR BLOCKADE:

The onset of motor blockade in group A was quicker (6.1 minutes) than B (8.77 min) and the difference is statistically significant.

SUCCESS RATE:

A successful block was defined as anaesthesia sufficient for pain free surgery without supplementation. Blocks in the A group were successful in 20 out of 20 cases(100%) and in the B group 17 of 20 cases(90%) and the difference is statistically significant.

FAILURE RATE:

In the present study , 3 Cases in Group B for which block failed, the planned surgical procedures were carried out with general anaesthesia. In case of block failure other modalities of anesthesia preferred are iv sedation, laryngeal mask airway anesthesia (23)

COMPLICATIONS(23):

There were no complications seen in both the groups during the Study.

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CONCLUSION

On doing a comparison between using neuro-laxation alone versus anatomical landmarks, it was observed that the supraclavicular plex injection took significantly less time with neuro-linking. In order to achieve a shortening of the total duration of the process, a shorter duration of use of the ultrasonography was needed to localize the nerve than that of. Delays in the initiation of motor and perception/constriction of sensory/motor block were observed in the Ultrasound community compared to that of the control group.

The performance rate was improved with the use of the use of the ultrasound-guided expansion.

No significant complications were found in the two cohorts.

As a result, it is believed that ultrasound is clinically helpful for nerve localization and reduction in the number of needle attempts, the treatment time required to place a suprapubclinal plex is shorter and therefore seems to be much more effective than an ultrasonic navigator driven technique.

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Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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