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Original Research

Evaluation of the effectiveness of ketamine in chronic low back pain patients- A clinical study

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ABSTRACT:

Background: The present study was conducted to evaluate the effectiveness of ketamine in chronic low back pain patients. **Materials & Methods:** The present study was conducted on 48 patients of chronic low back pain of both genders. Patients were divided into 2 groups of 24 each. Group I patients were given 25 mg ketamine and Group II patients were given in and 50 mg ketamine as adjunct to 40 mg triamcinolone in total 6 ml volume given epidurally. Assessment of pain using visual analogue scale (VAS) and side-effects were recorded. **Results:** The mean age in group I was 46.2 years and in group II was 47.8 years. The mean weight was 65.3 Kgs and in group II was 64.5 kgs. The mean height was 154.2 cm in group I and 155.8 cm in group II. The mean VAS at baseline in group I was 74.3 and in group II was 81. At 2 weeks, in group I was 45.2 and in group II was 53.6, at 4 weeks in group I was 43.6 and in group II was 42.7, at 8 weeks in group I was 37.8 and 32 at 12 weeks was 32.5 in group I and 31.2 in group II. The difference was significant (P< 0.05). 4% in group I and 16% in group II had hypertension, 3% in group I and 10% in group II had tachycardia, 5% in group I and 1% in group II had nausea and 30% in group I and 54% in group II had hallucinations. **Conclusion:** Authors found that ketamine in dosage of 50 mg is effective as compared to 25 mg in chronic low back pain patients.

Key words: Chronic low back pain, Ketamine, Hypertension.

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INTRODUCTION

Chronic low back pain (LBP), a multifactorial and multidimensional problem with both sensory and emotional components, is challenging to manage. It is one of the leading causes of chronic pain.[1] The most frequent cause of LBP is intervertebral disc pathology, ranging from a ligamental tear to disc degeneration, herniation, protrusion and extrusion. Epidural steroid injection (ESI) acts by multiple mechanisms like anti-inflammatory, antinociceptive, decreased capillary permeability and reduced intra-neuronal oedema.[2]

In chronic pains, neuropathic aspect occurs due to NMDA receptor sensitisation at pre-synaptic site resulting in increased glutamate release and its phosphorylation at the post-synaptic site, manifesting as wind up phenomenon. Based on this concept, ketamine, an NMDA receptor antagonist with mild opioid receptor action as well as local anaesthetic properties, has been used in a wide range of doses through epidural and intrathecal routes for acute postoperative and chronic neuropathic pain conditions. There is no single effective drug dose recommended in the above-said trials.[3]

Based on recent concepts of pain, during inflammation there is an increase in glutamate and aspartate; its role in central sensitization and wind up has been known.[4] Wind up can magnify responses of dorsal horn neurons up to 20- fold in magnitude and duration. NMDA receptor antagonists prevent induction and maintenance of the central sensitization process which is usually manifested as a post injury reduction of pain threshold and hypersensitivity of the withdrawal reflexes.[5] Ketamine is an NMDA receptor antagonist which has potent anesthetic and analgesic effects. Ketamine has been used in pain medicine in recent years with increasing frequency along with multiple publications.[6]

The present study was conducted to evaluate the effectiveness of ketamine in chronic low back pain patients.

MATERIALS & METHODS

The present study was conducted in the department of Anaesthesia. It comprised of 48 patients of chronic low back pain of both genders. All were informed regarding the study and their written consent was obtained. Ethical clearance was obtained before starting the study.

Demographic profile of patients was recorded. Patients were divided into 2 groups of 24 each. Group I patients were given 25 mg ketamine and Group II patients were given in and 50 mg ketamine as adjunct to 40 mg triamcinolone in total 6 ml volume given epidurally. Assessment of pain using visual analogue scale (VAS) and side-effects were recorded. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Age (years)	46.2	47.8
Weight (Kgs)	65.3	64.5
Height (cm)	154.2	155.8

Table I shows that mean age in group I was 46.2 years and in group II was 47.8 years. The mean weight was 65.3 Kgs and in group II was 64.5 kgs. The mean height was 154.2 cm in group I and 155.8 cm in group II.

Table II Comparison of VAS in both groups

	Group I	Group II	P value
Baseline	74.3	81.4	0.01
2 weeks	45.2	53.6	0.04
4 weeks	43.6	42.7	0.81
8 weeks	37.8	32.0	0.90
12 weeks	32.5	31.2	0.86

Table II shows that mean VAS at baseline in group I was 74.3 and in group II was 81. At 2 weeks, in group I was 45.2 and in group II was 53.6, at 4 weeks in group I was 43.6 and in group II was 42.7, at 8 weeks in group I was 37.8 and 32 at 12 weeks was 32.5 in group I and 31.2 in group II. The difference was significant (P< 0.05).

Graph I Complications in both groups

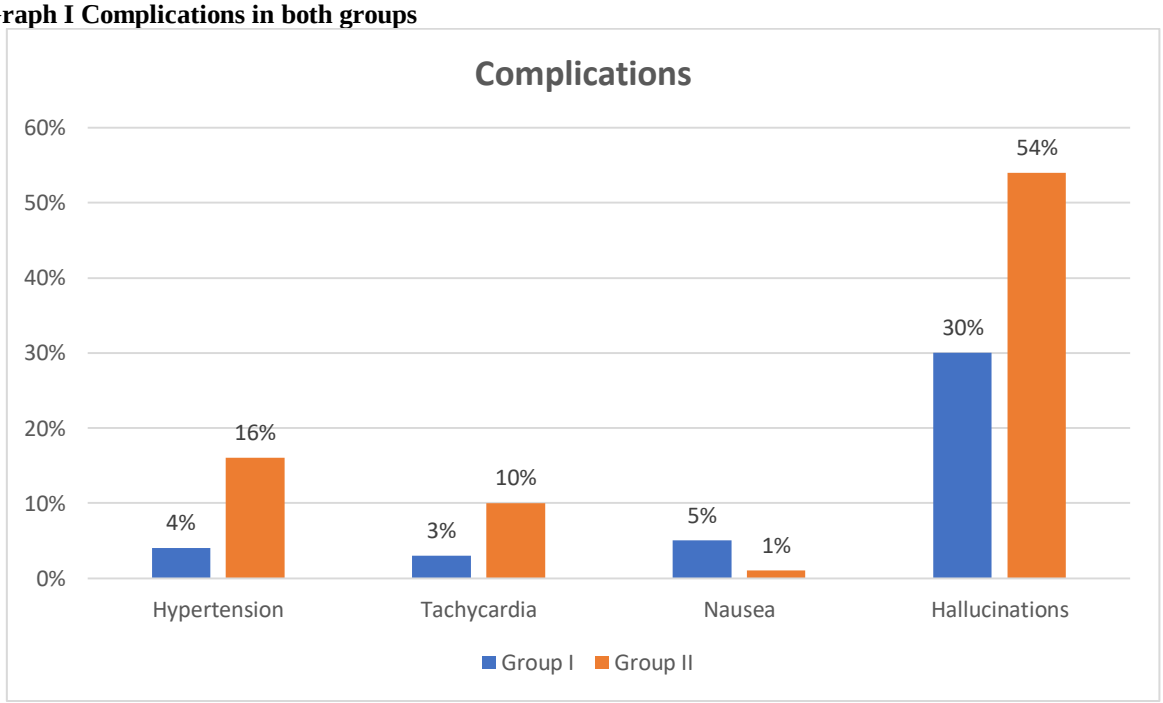

Table III Complications in both groups

Complications	Group I	Group II	P value
Hypertension	4%	16%	0.01
Tachycardia	3%	10%	0.05
Nausea	5%	1%	0.04
Hallucinations	30%	54%	0.02

Table III, graph I shows that 4% in group I and 16% in group II had hypertension, 3% in group I and 10% in group II had tachycardia, 5% in group I and 1% in group II had nausea and 30% in group I and 54% in group II had hallucinations.

DISCUSSION

Ketamine is commonly used as an analgesic in emergency medicine and as an adjuvant drug in the perioperative setting. In addition, it is used as a third-line adjuvant drug for opioid-resistant pain in palliative care and for intractable chronic noncancer pain.[7] More recently, ketamine is increasingly being used to treat major depression and other mood disorders. Ketamine is a phencyclidine derivative that was developed in the 1960s as an anaesthetic agent.[8] The most important pharmacological properties of ketamine are due to it being a noncompetitive *N*-methyl-D-aspartate (NMDA) receptor antagonist, and its analgesic action at subanaesthetic dose is believed to be primarily due to NMDA receptor antagonism in the brain and spinal cord. The NMDA receptor is important for learning, memory, and synaptic plasticity.[9] The present study was conducted to evaluate the effectiveness of ketamine in chronic low back pain patients.

In present study mean age in group I was 46.2 years and in group II was 47.8 years. The mean weight was 65.3 Kgs and in group II was 64.5 kgs. The mean height was 154.2 cm in group I and 155.8 cm in group II. Gupta et al[10] evaluated the analgesic efficacy in patients who received 25 mg ketamine in Group I and 50 mg ketamine in Group II. Pain evaluation within the groups over time showed significant improvement from baseline and between the groups showed comparable VAS scores at 12 weeks (P = 0.392). The PSS, pain-free duration and number of repeat injections were also statistically comparable. However, the QoL improved more in Group II vs Group I (P = 0.024). The short-lasting side effects were more in Group II, but no features of neurotoxicity were observed in any patient. The analgesic efficacy of adjuvant therapy with 50 mg ketamine appeared comparable to 25 mg ketamine. Although, there was a better quality of life and longer pain-free interval with 50 mg ketamine, the side effects were more.

We found that mean VAS at baseline in group I was 74.3 and in group II was 81. At 2 weeks, in group I was 45.2 and in group II was 53.6, at 4 weeks in group I was 43.6 and in group II was 42.7, at 8 weeks in group I was 37.8 and 32 at 12 weeks was 32.5 in group I and 31.2 in group II. 4% in group I and 16% in group II had hypertension, 3% in group I and 10% in group II had tachycardia, 5% in group I and 1% in group II had nausea and 30% in group I and 54% in group II had hallucinations. Basuni et al[11] observed neurotoxicity with a dose of >25 mg when used intrathecally in obstetric patients, but, other researchers including Khezri MB et al[12] used it intrathecally in patients with no such side effects. Despite the concerns raised by the above study and FDA announcement regarding intrathecal use of ketamine, some authors still favour its use for lumbar epidural or intrathecal administration.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that ketamine in dosage of 50 mg is effective as compared to 25 mg in chronic low back pain patients.

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