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Original Research Article

Effectiveness and Tolerance Profile of Thiocolchicoside and Tolperisonein Acute Low Back Pain with Musculoskeletal Stiffness Through Telemedicine Consultation During Lockdown Period of Second Wave of COVID-19 Pandemic in Eastern Part of India

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Abstract

Background: Adult population commonly report acute low back pain and muscle stiffness during the lockdown period of coronavirus disease 2019 (COVID-19) pandemic which can be attributed to restricted mobility, prolonged home stay, work from home with poor ergonomic support and longer period of immobility due to COVID-19 infection. **Objective:** The study intended to compare the effectiveness and tolerance profile of tolperisone and thiocolchicoside in acute low back pain with muscle stiffness. **Settings and Design:** This was an open label prospective study, conducted at atertiary care centre in the eastern part of India. The study was carried out during the lockdown period of second wave of COVID-19 pandemic through telemedicine consultation. **Material and Methods:** Numerical pain rating score(NPRS) at rest and movement, and finger to floor distance(FFD) were used for evaluating the effectiveness of drugs while Physician global assessment score and side effect of the drugs were used for evaluating the tolerance profile. **Results:** Total 88 patients were enrolled, and equally divided into two groups. Mean age was 34.15±8.68years and 33.06±7.39 years respectively in group A and Group B. NPRS and FFD were significantly reduced in both the groups at day 3 and day 7 ($p<0.05$). On within group analysis there was no significant reduction in NPRS at day 3 and day 7 ($p>0.05$).Within group analysis also displayed no significant improvement ($p>0.05$) in tolerance profile at day 3 and day 7, butinter-group analysis showed a better tolerancein group B compared to group A. **Conclusions:** Both tolperisone and thiocholchicosideare effective centrally acting muscle relaxants in acute low back pain associated with muscle stiffness, but tolerance profile is poor with tolperisone as compared to thiocolchioside.

Keywords: Acute low back pain, Tolperisone, Thiocolchicoside, COVID-19 pandemic, Second wave.

Introduction

India has been severely affected by the second wave of the coronavirus disease 2019 (COVID-19) and hospitals in several states are struggling with the shortage of health workers, vaccines, oxygen, drugs, and beds. The second wave beginning in March 2021 had a bigger impact on healthcare system than the first wave[1]. Even the profile of patients is different from the first wave of COVID-19. Furthermore, the proportion of younger population affected in second wave is more in comparison to the first wave. Also, hospital stay and period of home isolation are longer in the second wave. On 30 April 2021, India became the first country to report over 400,000 new cases in a 24-hour period[2].

In general, 60% of Indian population suffer from low back pain during their lifespan [3]. Low back pain with muscle stiffness commonly occurs in younger age groups (less than 45 years) and is a common reason to consult a physician[2]. Low back pain is aggravated by many factors including age, gender, sedentary lifestyle, lack of physical performance, anxiety, depression, andwork place ergonomics[3,4]. During the second wave of COVID-19 pandemic due to a rapid surge of cases, many states of India like other countries in the world, instituted lockdown in phased manner to prevent the spread of thedisease[5]. Lockdown period has increased the incidence of low back pain due to stress, anxiety, lack of outdoor activity,and poor posture due to prolonged work from home[6]. Telemedicine consultation is considered as a novel approach for evidence-based practice during this lockdown [7]. Acute low back pain is usually managed with simple analgesics, non-steroidal anti-inflammatory drugs, opioids, compound analgesics, muscle relaxants, antidepressants in conjunction with other modalities [8]. Centrally acting muscle relaxant helps in managing the acute low back pain associated with muscle spasm by breaking the chain of spasm-pain-spasm cycle[9].

Thiocolchicoside is a byproduct of natural organic compound colchicines, which is extracted from the seeds of Gloriosasuperba[10]. Thicolchicoside have antagonistic action on gamma-aminobutyric acid type A (GABA-A) receptor and glycine receptor thereby displaying muscle relaxant and to some extent analgesic properties [11]. Due to less serious side effects, it is frequently used as an oral muscle relaxant[10,11]. Tolperisone is a tertiaryaryl amine derivative and stabilizes nerve membrane[12]. It has centrally acting muscle relaxant properties by inhibiting the presynaptic release of neurotransmitters through its action on the voltage gated sodium channels [13].

Both the above drugs are commonly used as muscle relaxant alone or in combination with other analgesics in setting of acute low back pain associated with muscle stiffness. There are several studies comparing the effectiveness of various muscle relaxants. During this COVID-19 pandemic situation, acute low back pain is the most common problem encountered through teleconsultation. In this study we aim to compare the effectiveness and tolerance profile of both the drugs in acute low back

pain associated with muscle stiffness through teleconsultation during the lockdown period.

Material and methods

Aim &objectives: This study intended to compare the effectiveness and tolerance profile of tolperisone and thiocolchicoside in acute low back pain with muscule stiffness through telemedicine.

Type of Study: Prospective open label randomized clinical trial.

Study Settings: This study was conducted by the department of physical medicine and rehabilitation at a tertiary care institute of Eastern India through teleconsultation.

Time Frame: 05th April 2021 – 21th May 2021

Inclusion Criteria:

1. All adults with acute low backpainassociated with muscle stiffness who consulted our teleconsultation facility during the study period.
2. Participants who were willing to participate andprovided an informed verbal consent.

Exclusion criteria:

1. Those with lumbar spine conditions such as spondylitis, fracture, osteoporosis, arthritis, spondylosis, muscular pathology like myositis, poliomyelitis, myotonia, muscular dystrophy; other systemic diseases like neurological conditions, cardiovascular conditions, peptic ulcer disease, gastroesophageal reflux disease, liver and kidney diseases, known allergy to thiocolchicoside and tolperisone; and those who had taken skeletal muscle relaxant in last seven days or confined to bed due to severe pain.
2. Pregnancy, lactating women, and women using contraceptive pills.
3. Patients not willing to participate.

No observer blinding or placebo treatment was undertaken. All patients of acute low back with back muscle stiffness providing informed consent were enrolled between 05th April2021 – 21th May 2021 as per inclusion and exclusion criteria. Follow up periods for all participants were 3rd and 7th day from baseline. Participants were randomized into two groups by simple random method. Patients in group A were treated with oral thiocolchicoside 4 mg twice daily and group B was treated with oral tolperisone 150 mg twice daily. Treatment was given for seven days in both thegroups.

Assessment of efficacy: Effectiveness of both the drugs was assessed by finger to floor distance(FFD), numerical pain rating score(NPRS) at rest and movement, and physician global assessment scale(PGA).

A. FFD: Stiffness of back muscles were assessed by FFD at 1st day, 3rd day and 7th day through tele-conferencing. Patients were asked to touch the floor with their fingertip keeping both knees straight. The distance between the tip of the finger and floor was measured using measuring tape in centimeters by another family member or attendant at the time of teleconsultation. During subsequents follow-ups, measurement was taken by the same family member or attendant with similar technique.
B. NPRS at rest and movement: Pain rating was assessed by NPRS at rest and during lumbosacral spine movement in both sagittal and coronal plane.
C. PGA score: It was assessed on seventh day on a four-point scale. The score was categorized as follows: excellent (improvement in pain by >90%), good (improvement in pain by 70-90%), average (improvement in pain by 50-70%), and poor (Improvement in pain by < 50%).

Tolerance profile: During this study the adverse events like drowsiness, nausea, vomiting, abdominal pain, diarrhea, and dizziness of drugs were noted.

Statistical methods: Descriptive and inferential statistical analysis were carried out in the present study. Continuous variables are presented as mean ± SD and categorical variables are presented as number (%). Significance is assessed at a 5% level of significance.

Results

A total of 88 patients were enrolled in the study including 70 male and 18 female participants (table 1). All participants were randomized and divided into two groups (44 in each group). The mean age was 34.15±8.68 yearsin group A and 33.06±7.39 years in group B (Table 2). Pain was evaluated by NPRS at rest andwith movement in both the groups. NPRS at rest on initial evaluation (baseline) was 5.55±0.73 in group A and 5.57±0.78 in group B. On first follow-up (day 3) NPRS at rest was 3.34±1.18 in group A and 3.00±0.88 in group B. Further, on second follow-up (day 7) NPRS at rest were 1.77±1.00 in group A and 1.43±0.81 in group B. Within group analysis showed a significant reduction in NPRS at rest both on day 3 and day 7. On comparison between the groups, there were no significant differences in NPRS at rest during subsequent visits ($p > 0.05$) (Figure 1). NPRS at movement on initial evaluation was7.02±0.73 in group A and 7.05±0.74 in group B. There was significant difference in NPRS at movement within group at day 3 and day 7 (4.43±1.12 and 2.36±1.14 in group A; 4.00±1.01 and 1.70±0.93 in group B respectively). On between the groups comparison at day 3 there was no significant difference ($p > 0.05$) but there was a significant difference at day 7 ($p < 0.05$) (Figure 2). Pain intensity during rest and movement significantly reduced on day 3 and day 7 in both the groups. There was slightly more improvement in group B as compared to group A in pain intensity both at rest and with movement. On initial evaluation, FFD was 17.18±3.06 in group A and 17.31±3.65 in group B. Within group analysis showed a significant difference in FFD on day 3 (11.95±2.37 in group A and 11.22±2.65 in group B) and day 7 (7.20±2.66 in group A and 5.34±2.04 in group B). On between group comparison there was asignificant difference in FFD at day 7 ($p<0.05$) (Figure 3). At final evaluation of FFD, there was aslightly more improvement in group B as compared to group A.

Table 1: Gender distribution of participants in both groups

Gender	Group A	Group B	Total
Female	9(20.5%)	9(20.5%)	18(20.5%)
Male	35(79.5%)	35(79.5%)	70(79.5%)
Total	44(100%)	44(100%)	88(100%)

P=1.000, Not Significant, Chi-Square Test

Table 2: Age distribution of participants in both groups

Age (years)	Group A	Group B	Total
<20	1(2.3%)	1(2.3%)	2(2.3%)
20-30	18(40.9%)	16(36.4%)	34(38.6%)
31-40	9(20.5%)	18(40.9%)	27(30.7%)

>40	16(36.4%)	9(20.5%)	25(28.4%)
Total	44(100%)	44(100%)	88(100%)
Mean ± SD	34.15±8.68	33.06±7.39	33.61±8.03

Samples are age matched with P=0.527, student t test

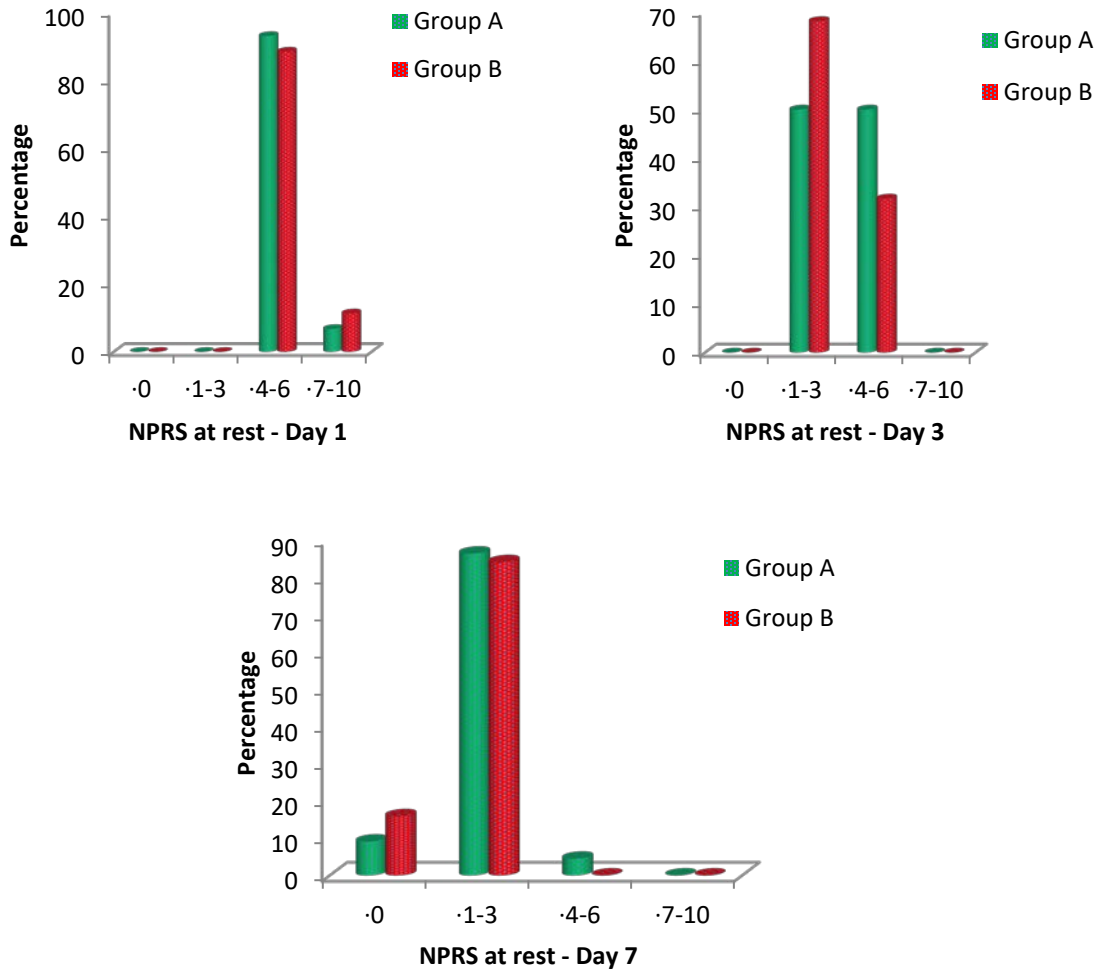


Figure 1: Comparison of NPRS at rest in both groups

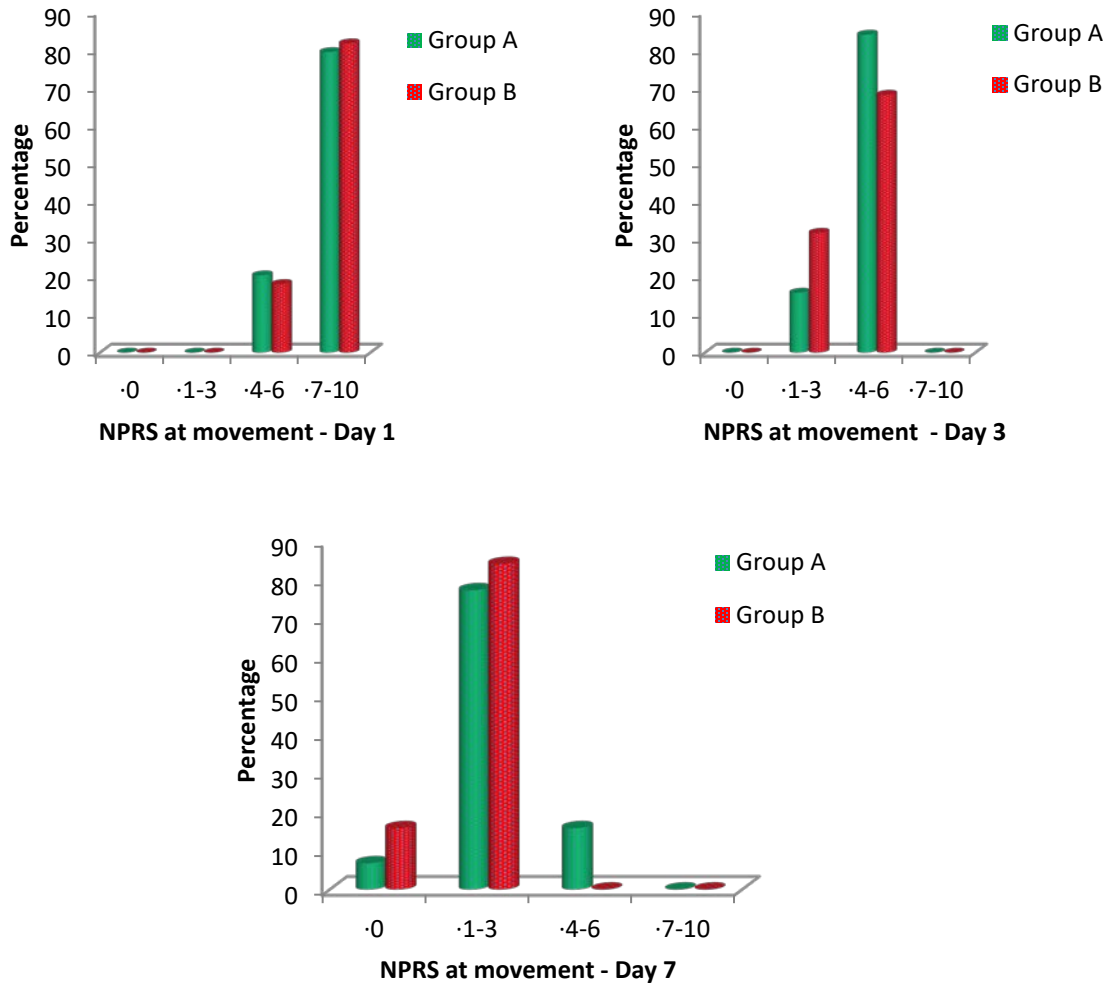
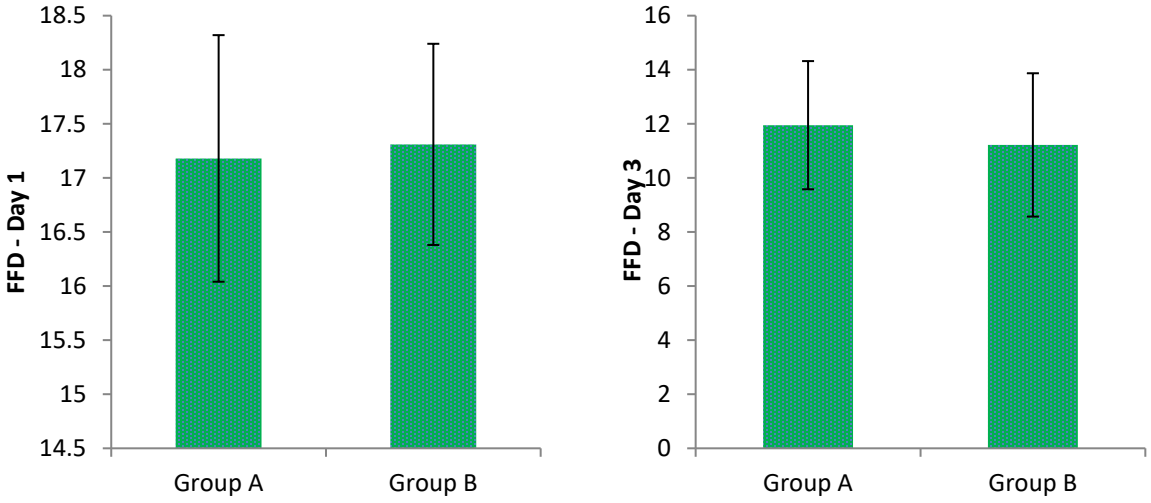


Figure 2:Comparison of NPRS at movement in both groups



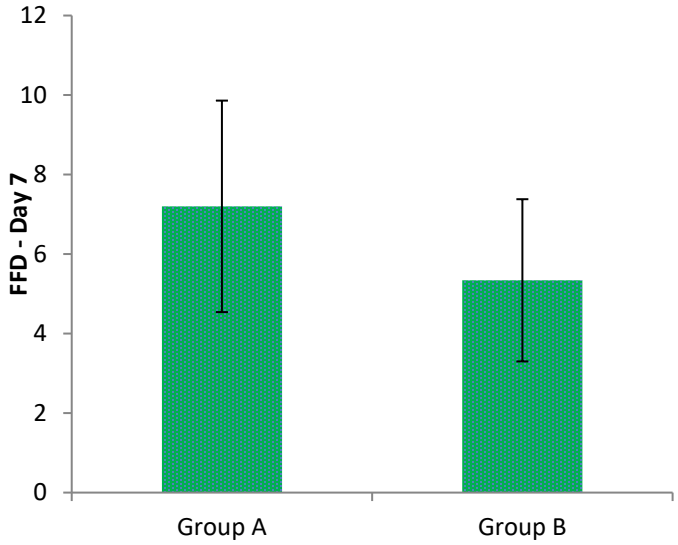


Fig.3: Comparison of FFD in both groups

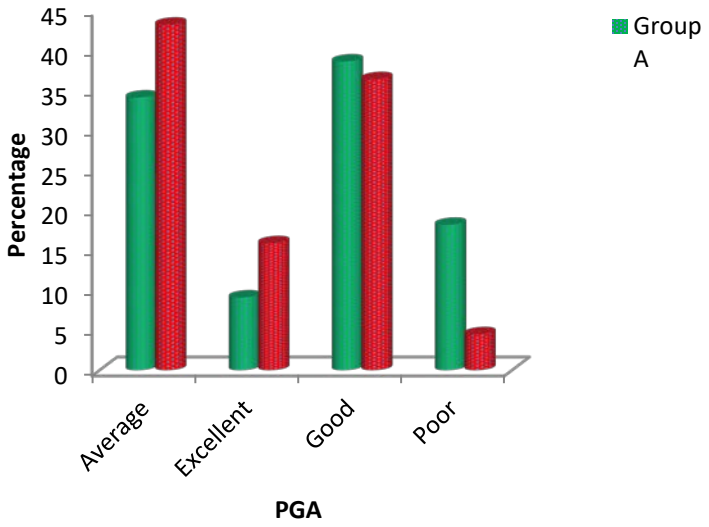


Fig.4:PGAfrequency distribution in both groups

Tolerance profile of both the drugs were assessed by PGA scale and adverse effects reported by the patients at the end of the treatment. The distribution of PGA was as follows: 9.1 % excellent, 38.6% good, 34.1% average, and 18.2% poor in group A; 15.9% excellent, 36.4% good, 43.2 % average, and 4.5% poor in group B. Adverse effects were reported by25% (9% nausea, 5% vomiting, 3% abdominal pain, 6% drowsiness, and 2% dizziness) in group A and by 16% (5% nausea, 5% vomiting, 2% abdominal pain, 2% drowsiness, and2% dizziness) in group B (Figure 4). Final evaluation showed group B patients were having better tolerance profile than group A.

Discussion

Low back pain is a very common problem in developing countries due to poor knowledge

about ergonomics, lack of exercise and sedentary lifestyle[14]. Work from home during lockdown period has increased the prevalence of low back pain[6]. Acute low back pain is often associated with musculoskeletal stiffness[15]. Most of the time the drugs used to treat acute low back pain are not confined to treat pain but also to relieve musculoskeletal stiffness. The purpose of this study was to determine the effectiveness and tolerance profile of thiocholchicoside and tolperisone through telemedicine consultation. Both the above drugs are centrally acting muscle relaxant and arecommonly used in the management of acute low back pain associated with muscle stiffness. Various studies reports that thiocolchicoside is a natural glycoside that activates GABA inhibitory pathway[16,17,18]. Study conducted by Vora A et al [19] reported that tolperisone acts at the level of spinal cord inhibiting spinal reflex activity by blocking voltage gated sodium and calcium channels.Bhattacharya et al[20] reported that the incidence of acute low back pain was highest in young middle age and male population. In our study,theo ccurrence of acute low back pain was 34.15±8.68 in group A and 33.06±7.39 in group B with a male predominance in both the groups. Both the groups were matched and no significant differences were present(P=0.527). Rao et al[21] reported that the improvement in pain (on visual analog scale), FFD, and PGA were significantly higher with tolperisone as compared to thiocolchicoside. We observed that on within group comparison the improvement in mean NPRS score at rest and at movement was significant (p = <0.05) both at day 3 and day 7.On between the group comparison the NPRS score at rest was not significant (p=0.085) but NPRS at movement was significantly higher with tolperisone as compared to thiocolchicoside (p=0.004). Furthermore, on within group comparison of FFD, the improvement was found to be significant in both the groups.Also, between the group comparison showed improvement in FFD was significantly higher with tolperisone as compared to thicolchicoside at day 7. PGA scale showed efficacy of tolperisone was better compared tothiocolchicoside. Cabitza et al[22] conducted a study to evaluatethe efficacy between eperisone and thiocolchicoside and found that after 12 days of treatment, there was no significant difference in FFD between the groups at any time. Eperisone showed a slight better efficacy than thiocolchicoside.

There was no serious side effects noted during the treatment period and even after discontinuation of the drugs during the follow-up period. Therefore, both tolperisone and thiocolchicoside seems to be well-tolerated.Thiocolchicoside group reported higher incidence of side effects like nausea (9%), vomiting (5%), abdominal pain (3%), drowsiness (6%), and dizziness (2%) as compared to tolperisone group. Dizziness and drowsiness both are common side effects of centrally acting muscle relaxants. In this study, thiocolchicoside group had more drowsiness and dizziness as compared to tolperisone group. Several other studies also support the above finding showing a lesser sedative effect with tolperisone as compared to others [21,23,24].

Conclusion

The result of this study shows that both the drugs results in a significant clinical improvement in pain and muscle stiffness in acute low back pain. Both the drugs are devoid of any serious side effects, but tolperisone have a favourable side effect profile as compared to thiocolchicoside. On comparative analysis tolperisone showed a slightly better efficacy and tolerance profile as compared to thiocolchicoside.

Limitations:

The limitations of this study were a small sample size, a shorter follow-up period, and poor reliability of the collected data.

Comparative studies requires larger sample size and longer follow up period to support our findings.

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