

Role of High TENS In Physiatric Management of Primary OA Knee?

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Abstract:

Objectives: To evaluate whether High TENS can control pain and subsequently improving tenderness, walk time in OA Knee.

Study Design – Prospective randomized controlled parallel group study.

Study Area – Osteoarthritis Clinic and OPD of Physical Medicine and Rehabilitation Deptt. IPGMER, SSKM, Hospital.

Sample - Patients with bilateral symmetrical primary OA Knee attending Osteoarthritis Clinic and OPD of PMR. IPGMER, SSKM Hospital from March2008 – November2014. Patients were divided into 2 groups.

- First group (total no. 30 patients) -risedronate (35mg.) [R].
- Second group (total no.30 patients) -- High TENS and risedronate (35mg.) [RT].

Outcome measures- VAS score for pain, WOMAC (pain, function), ROM by goniometry, inflammatory markers like HS CRP.

Results- Pain is decreased in both groups significantly ($p=0.000006$). There is statistically significant differences observed between group2 vs. group1 ($p=0.0329$). CRP are reduced in both groups. Walk time is increased in both groups significantly ($p<0.05$).

Discussion- High TENS has no role to control disease. But this modality is effective to alleviate symptoms of OA.

Conclusion- TENS has superior effect in Pain (VAS), Tenderness, and WOMAC (Pain) score.

Key words:- OA knee, High TENS, WOMAC

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I. Introduction

Osteoarthritis also erroneously called degenerative disease represents failure of the diarthrodial joints¹. In Idiopathic (primary OA), the most common form of the diseases, no predisposing factor is apparent¹. Cardinal pathologic feature of OA is a progressive loss of articular cartilage. OA is not a disease of only the cartilage but a disease of an organ, the synovial joint in which all of the tissues are affected - subchondral bone, synovium, meniscus, ligaments and supporting neuromuscular apparatus and cartilages¹. In primary OA it is believed that excessive loads cause failure of an otherwise normal joint².

Researches are going on the field of newer drug development for OA with newer concept of disease modification. These future drugs are supposed to target different steps and different pathways of the inflammatory cascades. Standard non-pharmacological treatments like therapeutic exercise can potentially reduce the inflammation by correcting altered joint biomechanics. Modalities like High TENS are known to produce reduction of pain by their action on pain gate and can bring other symptomatic improvement. High TENS can produce reduction of pain and other symptoms. Future direction in OA research and treatment are likely to involve earlier diagnosis and pharmacological treatment approaches aimed at chondroprotection and possibly chondroregeneration³.

II. Materials and Methods

This study was conducted in the Department of Physical Medicine and Rehabilitation IPGMER, SSKM Hospital, Kolkata for a period of 6 years 6 months (March2008 – November2014). All the patient with bilateral symmetrical primary OA Knee attending Osteoarthritis Clinic and PMR OPD, IPGMER and SSKM Hospital were included in this study group with following exclusion criteria:

1. Received nutriceuticals (e.g. glucosamine) or Risedronate or DMOAD in last 6 months.
2. Received I/A Hyaluronic Acid/ steroid in last 6 months.
3. Pregnant or Lactating women planning to conceive
4. Hepatic or Renal dysfunction.
5. Hypersensitivity to Risedronate.
6. Contraindication to High TENS.
7. Contraindication to strengthening exercise.

Informed consent was obtained from all individuals and the study was carried out in accordance with the Institutional Human Ethical Clearance Committee. A total 60 patients were included for 6 months (1 monthly follow up) in this prospective randomized controlled parallel group study.

Demographics and Medical history were taken at visit 1.0. Physical examinations were done at visit 1.0 and 6.0. Sixty small folded papers each with one number (from no.1 to no.60) written inside were randomly picked up and divided into two groups. Each group received therapeutic exercises, orthosis (if needed).

- First group (total no. 30 patients) -risedronate (35mg.) [R].
- Second group (total no. 30 patients) -- High TENS and risedronate (35mg.) [RT].

All patients were initially advised joint protection, education, weight reduction, ROM exercises and Multiple Angle Sub Maximal Isometric Quadriceps, Hamstring strengthening exercises 3 sets, 3 times a week, for the first 2 weeks and then daily. Isotonic strengthening exercises (both close kinetic chain and open kinetic chain) 3 times a week were added from 5th week. Knee orthosis and shoe/sliper modification (with heel wedge) were advised appropriately. High TENS was advised for 40 minutes, consecutively first ten days in a month for six months.

Careful assessment of pain by Visual Analogue Scale (VAS), ROM by goniometry, 50 feet walk time was measured at all visits. Joint Tenderness and Soft Tissue Swelling were evaluated on a 4-grade scale and 2 grade scales respectively at all visits. Pain, Stiffness and difficulty performing daily activities measured with help of WOMAC (Western Ontario MC Master Universities Osteoarthritis) index at each visit. Quantitative estimation of CRP was done at visit 1.0 and 6.0. At each visit clinical assessment was done to pick up adverse effects, which were recorded and treated appropriately.

III. Result Analysis

Data collected were analyzed by KRUSKAL-WALLIS analysis of variance followed by MANN-WHITNEY U TEST for POSTHOCOMparison between 2 individual groups. Comparison within groups by Friedman's analysis of variance followed by WILLCOCKSONS Matched pairs signed rank test for comparison between 2 individual time points. Categorical variable were compared between 2 groups by CHISQUARE Test or Fisher's EXACT Test as appropriate. All analysis has two tailed and p< 0.05 is considered statistically significant. Age composition of our study population showed that 83 % of patients are more than 45 yrs old with female preponderance (38 females, 22 males). BMI study of population showed that 52 % of both the male and female patients are above desired weight range. Our study design includes patients belonging to all four radiological grades of Kellgren –Lawrence system. But most of the patients belong to grade 2 and 3 in all three the study groups. Baseline CRP values of the patients were measured and the median was found to be 3.4mg/l which is much higher than the median value of serum CRP in normal population, which is reported to be 0.8mg/l⁴.

Outcome assessment:

Pain (VAS): Pain is decreased in both groups significantly (p=0.000006). There is statistically significant differences observed between group2 vs. group1 (p=0.0329). (Table1)

In both groups there is significant improvement occurs in swelling (p=0.024) ROM, WOMAC (Physical Function) (p=0.000006), WOMAC (Total) (p=0.000006). But there is no statistically significant differences observed between groups in reduction of swelling, ROM (p=0.1298), WOMAC Pain) (p=0.0799), WOMAC (Stiffness) (p=0.5969), WOMAC (Physical Function) (p=0.1053), WOMAC (Total) (p=0.2293).

Physician's Global assessment score is decreased in all both groups significantly (p=0.000006), but there is no statistically significant differences observed between groups (p=0.0545). Patient's Global assessment score is decreased in both groups significantly (p=0.000006), but there is no statistically significant differences observed between groups (p=0.0545).

CRP: CRP is reduced in both groups.

IV. Discussion

In this study 83 % of patients are more than 45 yrs old which is seen in the available study also.⁵ Incidence and severity of OA are greater in women than men⁵. BMI study of population showed that 52 % of both the male and female patients are above desired weight range. This observation is consistent with the information that greater BMI in both male and female has been associated with an increased risk of OA^{6,7}.

Nonpharmacological treatment i.e. orthosis, shoe modification, therapeutic exercises can reduce the inflammation, and modify the biochemical picture of the joint by improving the biomechanics of knee. It is found that CRP is elevated in both groups suggesting that OA is an inflammatory disease⁷.

Whereas High TENS has superior effect in Pain (VAS), Tenderness, WOMAC (Pain) than others. According to one study there is improvement in total WOMAC scores, pain VAS, knee range of motion and walking speed after 10 therapy sessions^{8,9,10,11,12,13,14,15}.

A study shows 40 minutes are the optimal treatment duration of High TENS, in terms of both the magnitude (VAS scores) of pain reduction and the duration of post-stimulation analgesia for knee Osteoarthritis and there is 70% to 80% pain relief success rate for High TENS⁸. Our study also supported the data.

Higher doses of risedronate (15 mg/day) strongly reduces the marker of cartilage degradation (CTX-II), which could contribute to attenuation of radiological progression of OA by preserving the structural integrity of subchondral bone

V. Summary And Conclusion

In conclusion this study consisting 60 patients of bilateral symmetrical primary OA Knee shows that nonpharmacologic interventions along with risedronate is definitely helpful for modification of sign, symptoms, morbidity, functional capacity and quality of life in OA knee patients. High TENS has superior effect in Pain (VAS), Tenderness, and WOMAC (Pain) score.

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TABLES

Table 1

Pain – VAS Score at Visit 6

| P value | 0.0329 | Dunn's Multiple Comparison Test | Difference in rank sum | P value | Summary |
|---|--------|---------------------------------|------------------------|--------------------|---------|
| PainV_6_R vs. PainV_6_RT | 15.111 | | | P < 0.05 | * |
| (Post-hoc comparison of those numerical parameters that have returned p value < 0.05 on Kruskal-Wallis ANOVA) | | | | | |

Table 2

Walking time at Visit 6

| P value | 0.0149 | Dunn's Multiple Comparison Test | Difference in rank sum | P value | Summary |
|--------------------|--------|---------------------------------|------------------------|----------|---------|
| WT_6_R vs. WT_6_RT | 14.667 | | | P > 0.05 | ns |

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