

Role of UST in Physiatric Management of Primary OA Knee.

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Abstract:

Objectives: To evaluate the effect of UST to reduce Swelling, control pain and subsequently improving tenderness, Range of Motion, 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 March 2008 – October 2014. Patients were divided into 2 groups.

First group (total no. 33 patients) - risedronate (35mg.) [R].

Second group (total no. 33 patients) - UST and risedronate (35mg.) [RU].

Outcome measures- VAS score for pain, WOMAC (pain, function), ROM by goniometry.

Results- In both groups there is significant improvement occurs in Swelling ($p=0.024$). Pain is decreased in both groups significantly ($p=0.000006$). Walk time is increased in both groups significantly ($p<0.05$). There is statistically significant differences observed between group 2 vs. group 1 ($p=0.0149$).

Discussion- UST is effective in improving Swelling, ROM, walking time, WOMAC (Stiffness), WOMAC (Physical Function). UST to alleviate symptoms of OA.

Conclusion- UST is more efficacious in improving Swelling, ROM, walking time, WOMAC (Stiffness), WOMAC (Physical Function), WOMAC (Total), .

Key words- OA knee, UST, WOMAC, Swelling

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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. UST can produce reduction of pain and other symptoms. Disease modifying activity of a non-pharmacologic agent, Pulsed Shock Therapy, is currently under investigation³. Future direction in OA research and treatment are likely to involve earlier diagnosis and pharmacological treatment approaches aimed at chondroprotection and possibly chondroregeneration⁴.

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 (March 2008 – October 2014). 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 nutraceuticals (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 UST.
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 66 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 six small folded papers each with one number (from no.1 to no.66) written inside were randomly picked up and divided into two groups. Each group received therapeutic exercises, orthosis (if needed).

- First group (total no. 33 patients) -risedronate (35mg.) [R].
- Second group (total no. 33 patients) -UST and risedronate (35mg.) [RU].

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/slipper modification (with heel wedge) were advised appropriately. UST was advised at a dose of 0.5 W/Cm². for 10 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. Patient of each group taken Tab Risedronate (35mg) once a week in empty stomach morning for 6 months and advised not to lying for 1 hour. 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 POSTHOCK comparison 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 77% of patients are more than 45 yrs old with female preponderance (39 females, 27 males). BMI study of population showed that 59 % 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.

Outcome assessment:

Swelling: In

both groups there is significant improvement occurs in Swelling ($p=0.024$). But there is no statistically significant difference observed between groups in reduction of swelling.

Pain (VAS): Pain is decreased in both groups significantly ($p=0.000006$).

Table 1

Walk Time: Walk time is increased in both groups significantly ($p < 0.05$). There is statistically significant differences observed between group 2 vs. group 1 ($p=0.0149$).

Table 2

In both groups there is significant improvement occurs in ROM, Tenderness ($p=0.024$), WOMAC (Pain) ($p=0.000006$), WOMAC (Stiffness) ($p < 0.05$), WOMAC (Physical Function) ($p=0.000006$), WOMAC (Total) ($p=0.000006$). But there is no statistically significant differences observed between groups in reduction of 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 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 both groups significantly ($p=0.000006$), but there is no statistically significant differences observed between groups ($p=0.0545$).

IV. Discussion:

In this study 77% 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 men.⁵ BMI study of population showed that 59% 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.

In this study it is clear that UST has greater role in increasing ROM, decreasing walking time, WOMAC (Stiffness), WOMAC (Physical Function), swelling, WOMAC (Total). 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 In 1992, the journal Arthritis Care & Research published a study analyzing the effect of ultrasound on mobility in osteoarthritis of the knee. They determined that ultrasound in conjunction with exercise increases soft tissue extensibility and may be an effective therapy in improving knee range of motion (flexion and extension), decreasing pain and increasing walking speed.^{8,9,10,11,12}

V. Summary And Conclusion

In conclusion this study consisting 66 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. Interestingly UST is more efficacious in improving Swelling, ROM, walking time, WOMAC (Stiffness), WOMAC (Physical Function), WOMAC (Total).

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Tables And Figure

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_RU 12.722 P > 0.05 ns

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_RU	16.944	P < 0.05 *		
WT_6_R vs. WT_6_RT	14.667	P > 0.05 ns	Figure 1	

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