Original Article

Association of locomotive syndrome risk with knee osteoarthritis

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Objective: To determine the risk of the locomotive syndrome with knee osteoarthritis grades and different factors.

Methodology: This pilot study was conducted in Benazir Bhutto Hospital, Rawalpindi from March to June 2018 and included 30 patients through Non-probability sampling technique. Inclusion criteria were both gender of age 45-65 years having grade II, III knee osteoarthritis and knee pain on most days of the past month with average pain severity of >4 on an 11 point numerical rating scale. Risk of the locomotive syndrome in these patients was assessed through 25- Risk Questionnaire, Two-Step Test and Stand up Test. Data were analyzed on SPSS version 21.

Results: Mean age was 49.5±3.44 years. Odds ratios showed that locomotive risk increased with Grade III osteoarthritis as compared to Grade II with odds ratios test of 25 Risk questionnaires 5.6, two-step test 9.3 and Stand up test 8.3. P-value for gender and socioeconomic status was less than 0.05.

Conclusion: Risk of Locomotive Syndrome is high with grade III knee osteoarthritis as compare to grade II. (Rawal Med J 202;45:846-849).

Keywords: Knee Osteoarthritis, locomotive syndrome, stand-up test.

INTRODUCTION

Locomotive syndrome (LS) is defined as "A condition of reduced mobility caused by locomotive organ's deterioration". This limitation results in difficulty in walking, stair climbing and standing up from sitting.[1] Initially, in 2007 the conception of the LS was presented by the Japanese Orthopedic Association (JOA). This syndrome shortly represented as "locomo" mention those who required nursing care services due to impairment of the locomotive organs.[2,3] The impairment may develop certain disorders which are diagnosed as sarcopenia, stress fractures, osteoarthritis (OA), spondylosis and so on.

Pain, slow pace walk, limited range of motion of joints, deformation, and decline in balance capacity are common signs and symptoms of LS.[4] The community needs to recognize the risk of developing LS and become aware of the early signs of the syndrome.[5] With the passage of time knee OA is likely to become the fourth most important cause of disability in women, and the eighth in men according to WHO. A Research on Osteoarthritis/Osteoporosis against Disability (ROAD) concluded that there is an overlapping of lumbar spondylosis, and hip osteoarthritis in the population, while there is co-existence of knee OA and LS in 42% population.[6]

A study showed a significant relationship of LS test sits to stand stage 1 with knee OA. Stopping progressive disability it is important to have preventive measures.[7] Hirano et al found that QOL was markedly impacted by LS and the scores from the VASs. For degenerative lumbar diseases and knee OA and experiencing low QOL score, LS is a good baseline concept.[12] In subjects over 65-year, medial meniscus extrusion can be associated with LS.[13] The aim of this study was to determine the risk of LS with knee OA grades and different factors.

METHODOLOGY

A pilot study was done from March to June 2018 at Benazir Bhutto Hospital, Rawalpindi and 30 participants were included through non-Probability, Purposive sampling technique. Inclusion criteria were both male and female patient of age 45-65 years having grade II, III knee osteoarthritis according to Kellgren-Lawrence Grading Scale and knee pain on most days of the past month with average pain severity of >4 on an 11 point numerical rating scale. Patients with any other types of arthritis, Positive knee surgical history, injury,

Lower limb arthroplasty, Intra-articular steroid injections (in the previous six months), BMI of more than 36 kg/m2 or any other medical condition which can affect their mobility were excluded from the study.

To assess the risk of LS selected patients performed the stand-up test, Two-step test and 25 question risk tests. The two-step test score was calculated using the following formula:

Length of both strides in cm ÷ patient height in cm = the patient two-step score

25-question GLFS is a self-administered, comprehensive measure, consisting of 25 items. These 25 items are graded with a five-point scale, from no impairment (0 points) to severe impairment (4 points), and then arithmetically added to produce a total score (minimum = 0, maximum = 100). Thus, a higher score was associated with worse locomotive function. The validity of the scale has been assessed, and a cutoff point of 16 was determined to have the highest sensitivity and specificity for an indication of disability resulting from the locomotive syndrome. (11). Stages of the clinical decision of LS limits are as follows:

In Stage 1: there is a score of <1.3 by Two-step test, in the stand-up test, Patient feels it difficult to stand-up with one-leg (any leg), in 25-question GLFS test, the score is ≥7.

Stage 2: score of Two-step test is <1.1, in the stand-up test, Patient feels it difficult to stand-up using both legs from a seat of 20-cm-height, in 25-question GLFS test, score ≥16.

Statistical Analysis: Statistical analysis was performed using SPSS version 21. Risk Analysis was found through chi-square between Osteoarthritis and Locomotive risk syndrome. Odds ratios were applied to find out knee OA association with different variables.

RESULTS

Descriptive statistics of demographics showed that mean age was 49.5±3.44 years, height was 157.86 ±6.9cm, weight was 74.03±11.69kg and BMI was 29.90±5.64 with male and female ratio 1:1. Socioeconomic status showed that 70% of participants belong to middle class while 30% were from lower class. Maximum number of patients did not perform exercise with percentage of 93.3%.Patient with osteoarthritis Grade II and Grade III were 36.7% and 63.3%, (Fig.)

Fig. Grading of osteoarthritis patients.

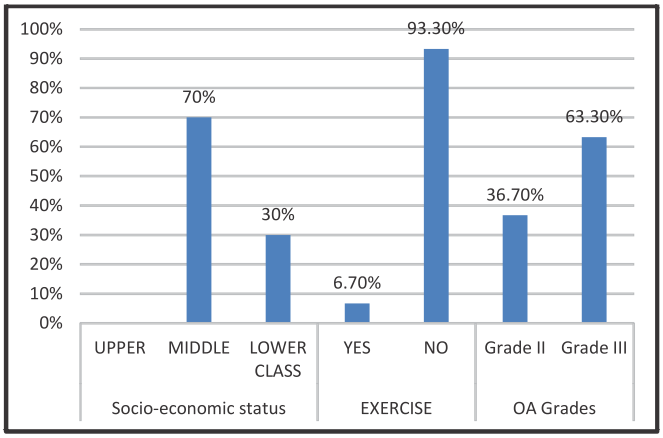

Table 1. Odds Ratio of osteoarthritis grades and locomotive risk syndrome.

Locomotive risk syndrome variables		Osteoarthritis Grades		Odds ratio(95% CI)	p-value
		Grade II	Grade III		
Locomotive risk Questionnaire	Level I	11	3	6.33 (2.24-17.89)	0.00
	Level II	0	16		
Stand up test	Level I	2	5	9.3 (3.2 -27.2)	.023
	Level II	9	14		
Two step test	Level I	10	0	8.33 (.409 -170.66)	.253
	Level II	1	19		

Table 2. Ratio of Osteoarthritis Grades and Different Variables.

Variables		Osteoarthritis grades		Odds ratio(95% CI)	p-value
		Grade II	Grade III	7.73 (2.03-29.69)	0.00
Gender	Male	9	2		
	Female	2	17		
Socioeconomic status	Middle class	5	16	3.45 (1.072-11.13)	0.02
	Lower class	6	3		
Exercise History	Yes	1	1	1.80 (0.10-31.98)	0.68
	No	10	18		
Age in categories	45-50 years	7	12	1.02 (.218-4.772)	0.97
	51-60 years	4	7		
BMI	20-25	3	4	1.60 (.281-9.24)	0.59
	>25	7	15		

Risk Analysis found through odds ratio between OA grades and LS risk variables in both Grades (II & III) and association was calculated through chi square. Results showed significant P-values for Locomotive Risk questionnaires, and Stand up test with values of 0.00, and .023 respectively. While two step test showed non-significant (p=0.253). While on the other hand Odds ratios showed that risk of LS was high with grade III OA as compare to Grade II with values of Locomotive Risk questionnaires, Stand up test and Two step test 6.33, 9.3 and 8.33, respectively (Table 1). Odds ratios of OA Grades and different factors showed positives Association between them. Association of Gender and Socioeconomic status with OA grades showed Significant (p=0.00 and 0.02) with 7.73 and 3.45 odds ratio. On the other hand, Association of exercise history, age in categories and BMI with OA grades showed non-significant (p=0.68, 0.97 and 0.59, respectively) with 1.80, 1.02 and 1.60 odds ratios, respectively (Table 2).

DISCUSSION

On the relationship of knee OA with locomotive risk syndrome concluded that with high OA grades the stand-up test, On the two-step test became most difficult to perform. These findings are following the results of some previous as, ROAD study was conducted and their baseline results suggested co-existence of LS have been determined with Hip and knee osteoarthritis. There was co-existence of knee OA and LS in 42% population.[7] Another study demonstrated the risk of immobility increased according to an increasing number of indices in both stages II and III this study also concluded that five-times-sit-to-stand-test (FTSST) time and walking speed increased exponentially with grade III knee OA.[2]

Yamada et al investigated the relationship between LS with Rheumatoid Arthritis and their results demonstrated a positive association between RA and LS risk (odds ratio 0.91). As major sign and symptoms and manifestations of RA and OA are similar, so these finding indirectly supports the results of the current study.[14] Results of Srilankan study showed 58.9% radiographic knee OA and the prevalence of moderate/severe (stage 3-4) knee OA among those with clinical kneeOA was 29.9%.[16] According to a study of 2011 results, the risk of OA knee development was markedly associated with BMI (kg/m2) adjusted for gender and age. The relative odds ratios for category (BMI <25.0) were 1.7 and 7.0 for subjects with BMIs (25.0–29.9).[15] After OA mostly patient get irritated from the pain and leave a physically active lifestyle. A study stated knee OA as a painful disease which affects the quality of life. But if patient consciously tries to lead an active lifestyle OA doesn't need to case inactivity in daily living.[17]

CONCLUSION

The risk of Locomotive Syndrome with Grade III Knee Osteoarthritis is more as compare to Grade II. Locomotive Risk is more in females and individual belonging to the middle class.

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