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To study of serum creatine kinase and lactate dehydrogenase enzyme marker responsible for muscular involvement.

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ABSTRACT
Introduction: Muscle disorders comprise a heterogeneous group of diseases that are either inherited or acquired. In 1991, Alan Emery published a review estimating the incidence for SMA type I to be around 4-6 in 100,000 (1 in 12,500 – 1 in 16, 667) live birth. which was based on only three studies. The onset of hypothyroidism is insidious and patients with generalized symptoms involving skeletal muscle dysfunction such as weakness, fatigue, tiredness and myalgia which indicates the involvement of the skeletal muscle system.
Aim: The aim of this study were to determine the activities of serum creatine kinase (CK) and lactate dehydrogenase (LDH) in muscular involvement and evaluate the relationship between CK, LDH levels .
Materials and methods : A total 50 patients with muscular involvement & 50 healthy individuals aged between 61-80 years who were not having liver disorders, diabetes mellitus, hypothyroidism, hyperthyroidism, myocardial infarction patients on stains and other medication that alter muscular involvement or enzyme marker vising to medicine OPD were include in study .Parameter such as CK, LDH were determined and compared with control subjects.
Result: Serum CK and LDH level were reported significantly higher case compared to control (P=0.000) in both genders
Conclusion: Muscular involvement is most common in middle aged subjects so clinicians should remain highly suspicious in middle aged subjects with muscular involvement for increase in enzyme marker parameter which may enhance the Myocardial infarction leading to artery disease.
Keywords:Muscular involvement Creatine kinase Lactate dehydrogenase

I. INTRODUCTION

Muscle are arranged in bundles of various grade and strength that allow for variable muscle force to suit each need relating to maximal or minimum contraction. Motor units consisting of nerve fiber and associated groups of muscle fibers are recruited as required by nerve stimulation . Peripheral muscle fatigue is generally viewed, as a result of insufficient energy and availability of key metabolites that enable contracting muscles to meet increased energy demand. Thus the CNS is informed by collective feedback mechanisms that include chemical, mechanical, and cognitive cues. The significance of each of these cues will depend on duration and power requirements of muscular activity.[1]

CK is a compact enzyme of around 82kDa that is found in both the cytosol and mitochondria of tissues where energy demands are high. In the cytosol, CK is composed of two polypeptide subunits of around 42kDa, and two types of subunit are found : M (muscle type) and B (brain type). These subunit allow the formation of three tissue-specific isoenzyme:CK-MB (cardiac muscle), CK-MM (skeletal muscle), and CK-BB (brain).

Typically.the ratio of subunits varies with muscle type: skeletal muscle 98% MM and 25% MB and cardiac muscle : 70-80%MM and 20-30%MB, while brain has predominantly BB.[2]

To date, only a few studies have studies have been performed to assess the prevalence and incidence of SMA. Most of these have been conducted before 1995, when the disease causing gene was identified, therefore using clinical rather than genetic diagnosis as an inclusion criterion. Generally, an estimation of the incidence of all types of SMA(Spinal Muscular Atrophy)of around 10 in 10,000 live births is cited.[3]

Lactate dehydrogenase (LDH) found in different types of human tissues is an oxidoreductase enzyme (EC 1.1.1.1.27). Although LDH is tetramer enzyme. only two subunit have been determined: H for heart and M for muscle. The main function of LDH is converting pyruvic acid, the final production of cellular energy.[4] It is normally located in small amounts in most of active

organs. Thus, high level of this enzyme may indicate unusual conditions that can result from liver muscular disorder (eg. Acute myocardial infraction) even from cancer disease.[5]

The intracellular lactate shuttle hypothesis posits that lactate formed during glycolysis can be continuously used as an energy source with in the same cell found negligible direct lactate oxidation in either subsarcolemmal or intermyofibrillar mitochondria isolated from rat red (oxidative) and white (glycolytic) muscles. [6]

II. MATERIALS AND METHODS

The present observational case control hospital based study was carried out after approval of Institutional Medical ethics committee conduced on 14/03/2020 at Rama Medical College, Hospital & Research Center in Collaboration with Department of Biochemistry on SERUM CREATINE KINASE AND LACTATE DEHYDROGENASE ENZYME MARKER RESPONSIBLE FOR MUSCULAR INVOLVEMENT." The study population included 50 patients of muscular involvement with enzyme marker 50 healthy individuals were enrolled in the study as per inclusion criteria who visited/ referred to medicine OPD. Informed consent was duly taken from each subject priored to study.

Study Design Case – control study
Study Duration ; February 2020 to February 2021
Sample Size : 100 patients.
Inclusion criteria:
Patients satisfying the IDE consensus worldwide definition of the muscular involvement.

- Diabetes mellitus
- Hypothyroidism and Hyperthyroidism
- Alcohol arthritis
- Rheumatoid arthritis
- Myocardial infarction

Exclusion criteria:

- Hepatosplenomegaly
- Liver disorder
- Patients under Long term medication

Sample collection

5ml of fasting blood sample was collected from antecubital vein into each plain vial for enzyme marker CK and LDH fresh serum / plasma EDTA, Citrate, heparinized or oxalate ant coagulated sample can be taken from each of the subjects under all aseptic condition after explaining the procedure to the study subjects. The blood sample was allowed to clot room temperature 20 minutes and serum was obtained by centrifugation at 4000 rpm (rotation per minute) for 15 minutes in the biochemistry laboratory and stored at- 20^0 C until assayed. The supernatant serum will be used for the analysis of serum CK and serum lactate dehydrogenase level.

CK estimation
Serum CK (MB) is estimated by Modified IFCC method.

LDH estimation
LDH estimation is estimated by Agappe kit, Scandinavian Committee on Enzymes (SCE) method.

Statistical analysis

Collected Data were analyzed using the Statistical Package of the Social Sciences (SPSS version 22.0). Data were presented as mean ± standard deviation Independent sample t – test, Chi – square test, Pearson correlation were used different parameter. The differences among the mean (Mean± SD) were considered significant if $P \leq 0.01$ & 0.05

III. RESULT

The present research work include 50 healthy population 46 male and 54 female, while out of 50 cases 40 were male and 60 female in the group of 0-80 years. The observation of the evince predominatly female population which comprises 54% in case and 43% in control and the ratio of the male over female is 1:1:63(1:2 approximately), and 1:4:5 respectively. There is a trend toward a higher prevalence of enzyme marker with

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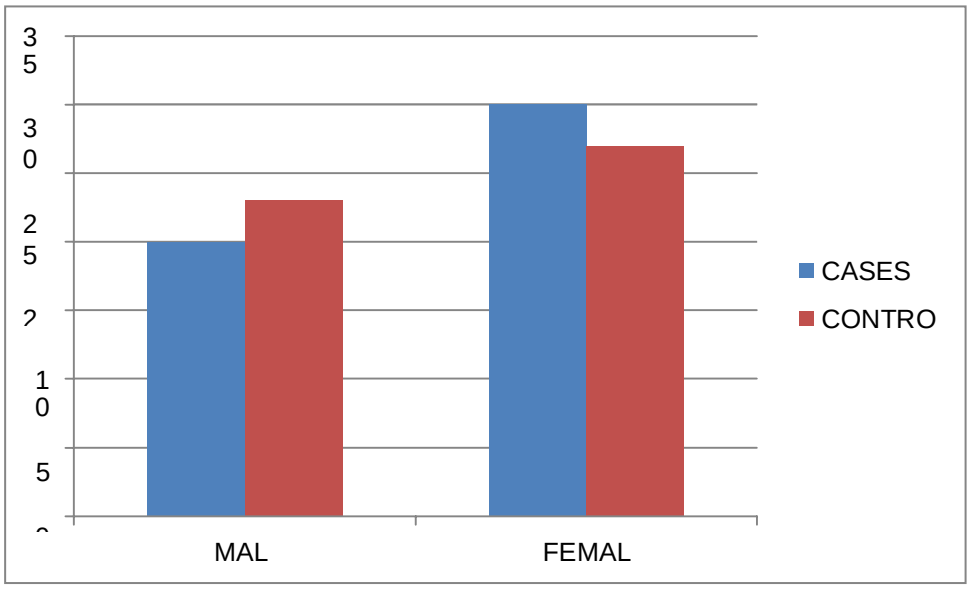
muscular involvement in the group 21-40 years in case. Majority (52%) of subjects in control are in 41-60 years age group. In the study we found highly significant positive correlation between CK and LDH , in both case and control (p= .000). The strength of correction is not dependent on the direction or the sign. A positive correction co efficient indicates that an increase in the first variable would correspond to an increase in the second variable. A negative correlation indicates that an inverse relationship where as one variable an increases, second variable decreases.

Table 3.1 The gender and age distribution of the total subject muscular involvement and healthy individuals included in the study.

SUBJECT		CASE		CONTROLS		TOTAL	
		N	%	N	%		
GENDER	MALE	20	40	23	46	43	100
	FEMALE	30	60	27	54	57	
AGE GENDER	0-20	4	2	8	16	12	100
	21-40	27	54	24	48	51	
	41-60	17	34	17	34	34	
	61-80	2	4	1	2	3	
TOTAL		50		50			

Graph 3.1 : Gender distribution in (%) of case and controls.



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Graph 3.2: Age (years) group distribution of case and controls.

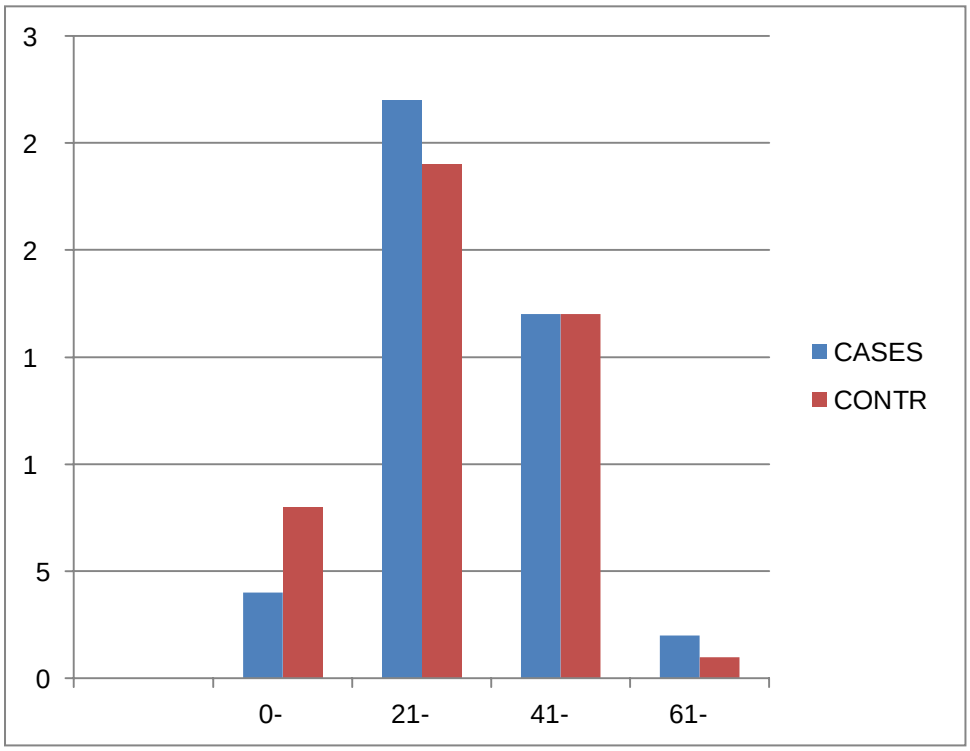

Table 3.2 : Patients of muscular involvement with enzyme marker with demographic, anthropometric & biochemical parameters of study subjects.

Parameter	case	control	' p' value
CK	**45.24±11.60**	**17.94±4.32**	**0.000**
LDH	**563.10±121.42**	**318.22±85.47**	**0.000**

Table 3.2 shows higher mean CK [45.24±11.60] is recorded in case compared to control 17.94± 4.32] with p value (0.000). Higher mean LDH [563.10±121.42] is recorded in case compared to control [318.22±85.47]. The variance is mean LDH among the case and control is found to be highly significant with p value (0.000).

IV. DISCUSSION

The concept of muscular involvement Hekim Soy et al 2005 in his study found skeletal muscle is effected more profoundly in case of over hypothyroidism Archan P et al in their study in 2007, there was increase in CK levels in patients with decreased T_3 levels. They found serum CK activity showed an increase relation with thyroid hormones. [7]

The liver disease high levels of LDH and one or more of LFTs especially alkaline phosphatase had been observed in patients (8 female and 4 males) For muscular damage, measurement of CK in patients with elevated levels of LDH and normal levels of LFT revealed that CK values elevated in three males and one female. Where as high LDH levels, as an indicator for cancer disease were found in there males and one female who had normal values of LFTs and CK.[8]

LDH know as oxidoreductase enzyme, is found in different types of human tissues. Although LDH is teterameric enzyme, but two subunit normally it is located in small amounts in most of active organ. Thus high level of his enzyme may indicate unusual condition that can result from liver muscular disorder (eg. acute myocardial infection) and even from various abnormality such as allergy, but not in patients with chronic obstructive pulmonary abnormality.

V. CONCLUSION

Muscular disorders comprise a heterogeneous group of diseases that are either

inherited or acquired. Biochemical screening for CK is of paramount importance in all muscular involvement patients , as well as in all patients with unexpected worsening of their enzyme marker or vice –versa because our data statistically suggest that the effect of muscular involvement is associated with enzyme marker that are characterized by increased serum creatine kinase, lactate dehydrogenase.

From this study, it can be concluded that muscular involvement is most common in middle aged subjects 21-40. So clinicians should remain highly suspicious in middle aged subjects with enzyme marker for increase in muscle damage parameter which may enhance the risk for hypothyroidism disease. Prevalence of muscle dystrophy is more common in enzyme marker as evident from our study. treatment and follow up of muscle disorder should include the monitoring of CK, LDH in order to decrease the possible effect of changing in the level of these parameters on the risk of MI disease in the patients of muscular involvement. On the other hand, there is an absolute need for large studies designed to answer the question to whether the enzyme marker is associated with increased risk for muscle disorder.

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Conflicts of Interest
None
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