

A Study on Fundus Changes Seen in Long Bone Fractures

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Abstract: Patients with long bone fractures are at risk of Fat Embolism Syndrome (FES). The aim of this study is to assess and compare the association of retinal changes seen in long bone fractures and its correlation to occurrence of FES in patients who had visible retinal changes. Fundus examination with direct ophthalmoscope (bed side) was recorded for 58 patients with long bone fracture. Fundus changes were seen in 2 out of the 58 patients examined who eventually treated for FES. Through this study we came to conclusion that regular screening for fundus changes in patients with long bone fractures should be conducted to prevent a life threatening condition like fat embolic syndrome (FES). While we can't conclude that retinal changes would guarantee the occurrence of FES it's a low cost method that can help in early diagnosis and morbidity caused due to fat embolism syndrome.

Keywords: Fat Embolism Syndrome, Fundus, retinal test

1. Introduction

Patients with long bone fracture are at a risk for Fat Embolism Syndrome (FES). FES is a rare clinical condition in which fat emboli circulation leads to multisystem dysfunction. A study conducted by Fabian et al states that the incidence of FES in long bone fracture can be between 11-29% [1]. Even with such high incidence of FES it is often undetected and leads to fatality. Especially in developing countries the cost of conducting some of these tests are very high. Earliest detectable signs of FES are seen in the retina and hence by conducting a Fundus examination FES can be detected early. Through this study we wanted to analyse if retinal changes observed in patients with long bone fracture could be a good proxy to detect and cure FES in time. In a prospective study, Chuang and associates examined 100 consecutive patients with long-bone fractures. They noted retinal findings in 4 patients and suggested that fundus examination may identify subclinical FES in patients at risk [2]

The fundamental hypothesis for this paper is that retinal changes study could be a cost effective measure for early detection of FES in patients with long bone fracture. In this research paper we will present the summary of the research methodology that was adapted, the key findings from the data captured and the conclusions we have arrived at post analyzing the data that was collected.

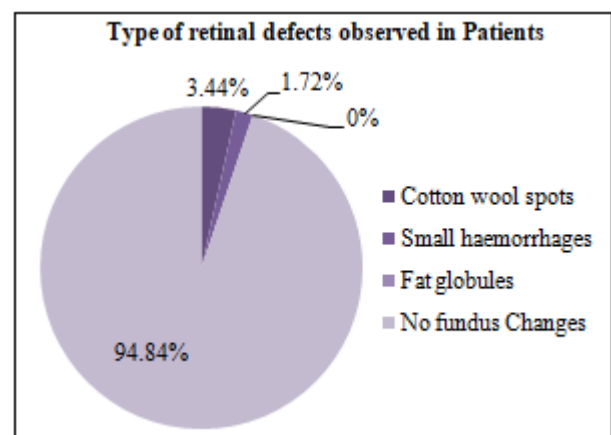
2. Research Methodology

We have conducted a prospective study on patients admitted in the Orthopaedics department at Chalmeda Anand Rao Institute of Medical Sciences (CAIMS), Telangana, India. We have conducted fundus examination of all patients with long bone fracture. Fundus examination was done using direct ophthalmoscope (bed side) and the tests were done of Day 1, 3, 5, 7 and 10 after the occurrence of long bone fracture in patients. Data of 58 patients admitted with long bone fracture between January 2018 and May 2019 was studied to understand the occurrence of FES because of the retinal changes observed in patients. Only patients with long bone fracture were considered for the study and the examinations were conducted within 10 days of the injury. We have excluded media opacities which precludes fundus

examination, and have also excluded patients suffering from diabetes and hypertension

3. Results

First let's look at the demography of the patients on whom the test was conducted. Patients of both sexes were included in the study. Out of the 58 patients 32 were Male and 26 were female. We also managed to conduct the study on patients with varied age groups. 18 patients studied were in the 21-40 years age group, 24 were in the age group 41-60 years and the remaining 16 patients were over 60 years. Fundus examination was performed on all the patients on Day 1,3,5,7 and 10 by using direct Ophthalmoscope (bed-side).



While majority of the patients didn't show any significant changes in fundus, we observed some defects in 2 out of the 58 patients that we have studied.

The first patient was a 26 year old male patient who was admitted in the orthopaedics department with femur fracture. When we did the retinal study on Day 3 for this patient we observed small hemorrhages and multiple cotton wool spots. The second patient who was 45 years male got admitted with tibial fracture presented with multiple haemorrhages on Day 5. Both these patients didn't have any history of diabetes or hypertension.

On further examination of these patients it was concluded that these two patients were susceptible to Fat Embolism Syndrome (FES). As we could detect the same during the Fundus study both the patients got timely attention and were properly treated for FES

4. Conclusion

Fat Embolism Syndrome (FES) is a highly under diagnosed disorder with a significant occurrence in patients with long bone fractures. If a retinal study is made mandatory for all the patients with long bone fracture we can detect retinal changes in these patients and can detect FES in early stages.



This is a simple yet cost effective method to detect FES in early stages and can be a very effective solution especially in developing markets such as India. Most parts of developed countries do not have access to high quality medical equipment required to detect FES and hence a retinal fundus test can act as a good proxy for early detection of FES. Hence we recommend regular screening for fundus changes in patients with long bone fracture. As it helps in early diagnosis and prevents mortality caused due to fat embolism syndrome

References

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