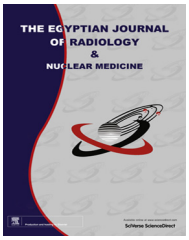
The Egyptian Journal of Radiology and Nuclear Medicine (2015) **46**, 695–699

Egyptian Society of Radiology and Nuclear Medicine

The Egyptian Journal of Radiology and Nuclear Medicine

www.elsevier.com/locate/ejrnm
www.sciencedirect.com



ORIGINAL ARTICLE

Multi-detector computed tomography assessment of the tibial plateau fractures

Amani Mohamed Fathi El Kharboutly

Department of Radiodiagnosis, Faculty of Medicine, Benha University, Benha, Egypt

Received 2 March 2015; accepted 17 May 2015
Available online 10 June 2015

KEYWORDS

Tibial plateau fractures;
MDCT;
Classification

Abstract *Objective:* The purpose of our study was to assess the role of multi-detector CT in the evaluation of tibial plateau fractures.
Subjects and methods: The study included twenty patients with fractures of the tibial plateau shown on computed tomographic images. All patients subjected to non-contrast MDCT in axial cuts and images are transferred to workstation; then they underwent coronal, sagittal reconstructed images and 3-D volume rendering that are of benefit in final diagnosis.
Results: A total of 20 patients were included (their mean age 27 years). It was found that the most common type is type II according to Schatzker classification, followed by type I.
Conclusion: The use of MDCT is advised for the accurate classification of tibial plateau fractures and so the management decision.

1. Introduction

Fractures of the tibial plateau present risks to knee functioning, since these are joint fractures of the proximal third of the tibia where load transmission takes place. They result from axial compressive forces that may or may not be combined with varus or valgus stress on the knee joint (1). This type of injury mainly affects young or middle-aged patients who are subjected to high-energy trauma, and elderly people who are exposed to low-energy trauma (2). The treatment for these fractures aims to achieve anatomical reduction of the joint surface and stable osteosynthesis in order to enable early mobilization, so as to prevent complications such as joint stiffness and post-traumatic arthrosis (3) (see Fig. 1).

The tibial plateau can be anatomically classified into the following 4 quadrants on an axial CT image at the subchondral level, as previously proposed by Luo et al. (4): anterolateral, posterolateral, anteromedial, and posteromedial (Fig. 2).

2. Patients and methods

The study included 20 patients complaining from knee trauma with suspected tibial plateau fractures.

Every patient was subject to the following:

1. Full history taking.
2. MDCT examination: All MDCT examinations were performed using 16 detectors CT scanner (GE bright speed). Reconstruction type: Standard bone window 3000/300(WW/WL). Standard soft tissue window 400/50 (WW/WL).

Peer review under responsibility of Egyptian Society of Radiology and Nuclear Medicine.

http://dx.doi.org/10.1016/j.ejrnm.2015.05.011

2.1. Preparation of the patient

Patient must be cooperative and able to hold still. Otherwise, the scan should be deferred. Backboards and other dense materials should not be in the scanning field.

2.2. Knee CT protocol

To obtain direct axial scans, the patient is lying supine with head first toward the gantry.

2.3. Image reconstruction (post processing techniques)

Axial 3-mm, reconstructed slices are obtained to examine all the knee joint bones. The axial source images were transferred to an advantage workstation (AW) volume share 2 for image reconstruction. Multiple techniques were used on AW.

3. Results

Twenty patients with suspected tibial plateau fractures were recruited in the study, and their ages ranged between 20 and 55 years with mean age 37.5 years. They were 17 males% and 3 females%. All patients were subjected to the multi-detector CT study.

3.1. Representation of some results were shown on (Tables 1 and 2)

In Table 1 (tabulation of the cases according to Schatzker classification) it is obvious that the most frequent type is type II seen in 7 cases accounting for about 35%. The second bone was the type I seen in 5 cases accounting for about 25%.

Also, the 3-D volume rendering images are for fracture extensions and confirmation of the reconstructed data is shown (Figs. 3–5).

4. Discussion

CT is used by most orthopedists to further characterize the fractures of the tibial plateau and assess the depression of the tibia and the degree of diastasis (splitting) of the fractured parts to plan for surgical intervention (6,7).

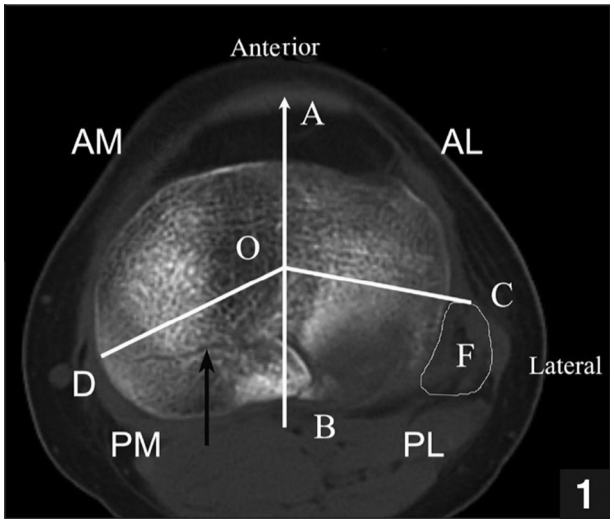


Fig. 2 Axial computed tomography scan at the subchondral level showing a posterolateral (PL) articular fragment. Point O is the center of the knee (midpoint of 2 tibial spines), point A is the anterior tibial tuberosity, point B is the posterior sulcus of the tibial plateau, point C is the most anterior point of the fibular head (F), and point D is the posteromedial (PM) ridge of the proximal tibia. Although a fracture line exists in the posteromedial quadrant (black arrow), the posteromedial cortex remains intact and a posteromedial fracture was excluded. Abbreviations: AL, anterolateral; AM, anteromedial (5).

Table 1 Distribution of patients according to age.

Age in years	Number of patients	Percentage (%)
20-	4	20
25-	6	30
30-	4	20
35-	2	10.5
40-	2	10
45	1	5
50-	1	5

There are numerous classification systems used for tibial plateau fractures to help classify the fractures and facilitate the treatment plan. Schatzker, Hohl and Moore and

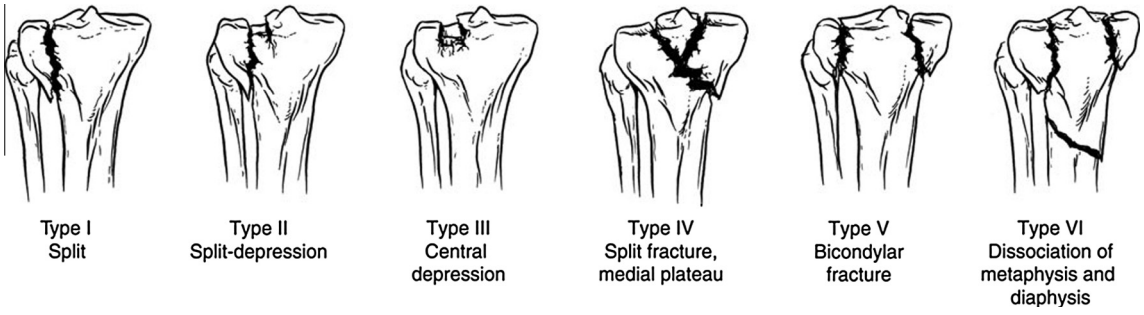


Fig. 1 The Schatzker classification system of tibial plateau fractures is shown. (Reprinted and published with permission from Berkson EM, Virkus WW. High-energy tibial plateau fractures. J Am Acad Orthop Surg 2006; 14: 20–31.)