

## LIPOHAEMOARTHROSIS OF THE LATERAL POSTERIOR FEMORAL RECESS

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One of the common causes of lipohaemarthrosis (LPH) is presence of intra-articular fractures. The imaging features of LPH are typically seen in the suprapatellar pouch of the knee. We report a case of LPH with a three layer fluid-fluid level in the lateral posterior femoral recess of the knee, posterior to the lateral femoral condyle.

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## ЛИПОГЕМАРТРОЗ ЛАТЕРАЛЬНОГО ЗАДНЕГО ФЕМОРАЛЬНОГО КАРМАНА

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Одной из распространенных причин липогемартроза является наличие внутрисуставных переломов. Типичные признаки липогемартроза обычно видны в области супрапателлярной сумки коленного сустава. Мы представляем клинический случай липогемартроза с трехслойным уровнем жидкость-жидкость в боковом заднем феморальном кармане коленного сустава, кзади от бокового мыщелка бедренной кости.

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**Introduction.**

One of the common causes of lipohaemarthrosis (LPH) is presence of an intra-articular fractures [1, 2]. These can be seen in a variety of joints with knee being the most common [2-4]. The imaging features of LPH are typically seen in the suprapatellar pouch of the knee. We report a case of LPH with a three layer fluid-fluid level in the lateral posterior femoral recess of the knee, posterior to the lateral femoral condyle.

**Case report.**

18 year old female presented with an acute right knee injury following a skiing accident. There was no relevant past medical history of note. She had MRI of the right knee which demonstrated a minimally displaced intra-articular fracture of the proximal tibia with a minimally displaced fracture of the avulsion fracture of the tibial spine at the tibial attachment of the ACL. There was a large knee joint effusion with a fluid-fluid level in the suprapatellar pouch and a further three layered LPH in the posterior recess

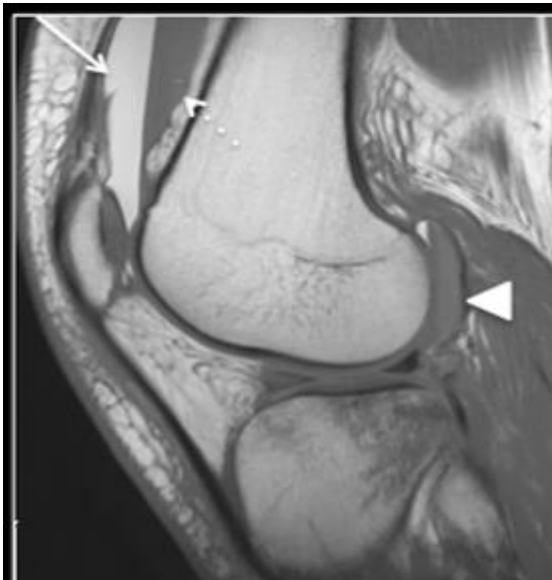


Fig. 1 а (Рис. 1 а)



Fig. 1 б (Рис. 1 б)

**Fig. 1. MRI. Knee joint.**

Sagittal T1(a) and PDFS(b) showing a fluid fluid level in the suprapatellar pouch (fat layer (arrow), serum (dashed arrow)) and three layer of LPH (arrow head – most dependent layer with red blood cells, white blood cells and hemoglobin) in the posterior recess of the knee.

**Рис. 1. МРТ. Коленный сустав.**

Сагиттальные T1 (а) и PDFS (б) изображения, демонстрирующие уровень жидкости в супрапателлярной сумке (жировой слой (стрелка), сыворотка (пунктирная стрелка)) и три слоя липогемартроза (острие стрелки – самый зависимый слой с эритроцитами, лейкоцитами и гемоглобином) в заднем кармане коленного сустава.

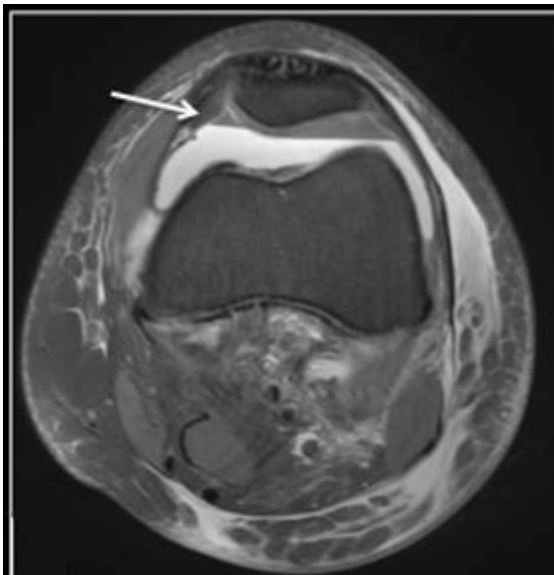


Fig. 2 а (Рис. 2 а)



Fig. 2 б (Рис. 2 б)

**Fig. 2. MRI. Knee joint.**

Axial PDFS showing fluid fluid levels in the suprapatellar pouch (arrow (a)) and three layer of LPH posterior to the lateral femoral condyle (arrow(b)).

**Рис. 2. МРТ. Коленный сустав.**

На аксиальных PDFS изображениях показаны уровни жидкости в супрапателлярной сумке (стрелка (а)) и три слоя липогемартроза позади латерального мыщелка бедренной кости (стрелка (б)).

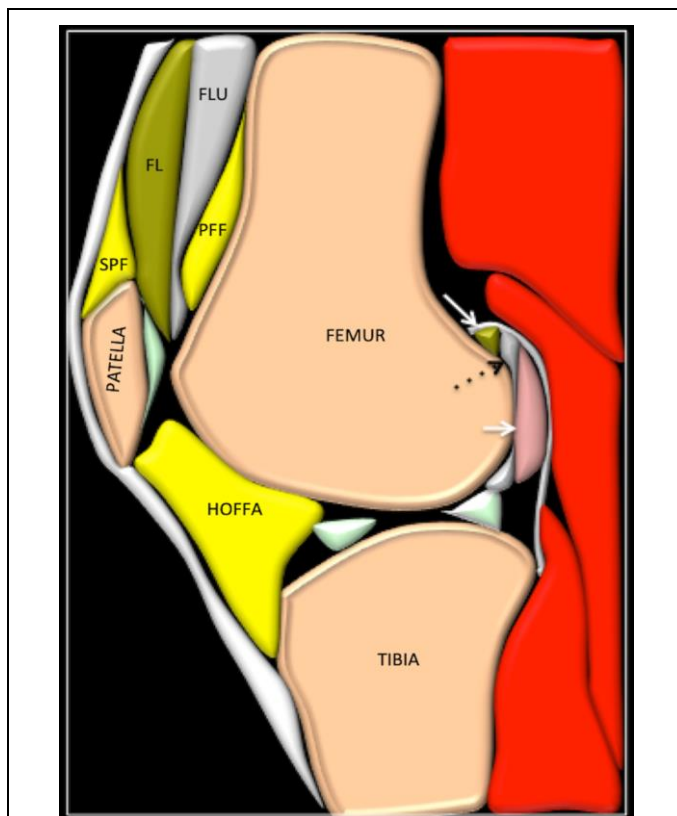


Рис. 3 (Fig. 3)

**Fig. 3. Scheme. Knee joint.**

Animation of the sagittal of the knee showing fluid levels of LPH (arrow – fat layer, black dashed arrow – serum, short arrow – dependent layer of blood cells and hemoglobin). FL (fat layer), FLU (serum), PFF (prefemoral fat pad), SPF (suprapatellar fat pad).

**Рис. 3. Схема. Коленный сустав.**

Анимация сагиттального среза коленного сустава, показывающая уровень жидкости при липогемартрозе (стрелка – жировой слой, черная пунктирная стрелка – сыворотка, короткая стрелка – зависимый слой клеток крови и гемоглобина). FL (жировой слой), FLU (сыворотка), PFF (префеморальное жировое тело), SPF (наднадколенниковое жировое тело).

behind the lateral femoral condyle (Fig. 1-4). The orthopedic surgeon managed operatively to repair the ACL avulsion injury.

**Discussion.**

LPH of the knee is a common finding in patients following knee trauma. This is seen in approximately 40% of patients with intra-articular fractures [1]. However 100% of those with LPH have intra-articular fractures [1]. This is due to extravasation of marrow fat into the joint through an intra-articular fracture. LPH has three layers: the floating fat forms – the most superficial layer, the serum forms – the second layer and the most dependent layer consists of red and white blood

cells [2, 5, 6]. LPH can be diagnosed on lateral radiographs, ultrasound, CT and MRI [2, 5-8]. The MR features of LPH are dependent on the composition of each layer. The most superficial layer has signal features of fat with high signal on T1 and T2 and low signal on fat suppression sequences. The second layer is low on T1 and high on T2. The bottom layer of LPH is of isointense signal to muscle on T1 and higher than muscle signal on T2. LPH can be seen in any intracapsular region, though the suprapatellar pouch is by far the most common [2]. Other sites occasionally seen include between superficial and deep parts of the MCL, the infrapatellar recess. LPH may infrequently be seen within a Baker's cyst [2].

In this report, we describe a case of fluid-fluid level (two layer) within the suprapatellar pouch and classic three layer fluid level in the posterior recess, posterior to the lateral femoral condyle. There was an associated avulsion fracture of the tibial spine at the tibial attachment of the ACL as well as a minimally displaced intra-articular fracture of the proximal tibia. Anterior translation of tibia of greater than 5 mm is associated with an ACL tear with a specificity of 80-99% and sensitivity of 56-86% [9-11]. There was no anterior translation of tibia in relation to femur in our case. This could be due to hinging of the tibial spine avulsion fracture with the proximal tibia. The posterior recess, behind the lateral femoral condyle is normally obliterated by the posterior aspect of the lateral femoral condyle in patients with anterior translation of the tibia in relation to the femur. However in our case the posterior recess was formed as a sequela of a pivot shift pattern of injury but not obliterated, as there was no tibial translation. We postulate that this allowed the LPH to form in this anatomic recess.

LPH does not occur immediately after injury. Previous in vitro and cadaveric studies have showed that the three layers form from a blood-fat mixture at 30 minutes - 3 hours [5, 8]. The presence of the three layer appearance of LPH only in the lateral aspect of the posterior recess in our patient suggests that this portion of the posterior recess has been separated from the rest of the knee for at least 30 minutes. The posterior femoral recess has previously been described as a continuous synovial recess between the posterior aspect of the medial and lateral femoral condyles and posterior capsule, with 9% of post traumatic effusions occurring in this location [12, 13]. One possible explanation for the apparent sequestration of LPH in the lateral aspect of the posterior femoral recess in our patients is that the PCL acts as a boundary between this portion of the recess and the rest of the knee.

**Conclusion.**

LPH is a classic radiological finding with in



Fig. 4 a (Рис. 4 а)



Fig. 4 b (Рис. 4 б)

**Fig. 4. MRI. Knee joint.**

Sagittal T1 (a) and PDFS (b) showing avulsion fracture of the tibial spine at the tibial attachment of ACL (arrow) and fracture of the proximal tibia (dashed arrow).

**Рис. 4. МРТ. Коленный сустав.**

Сагиттальные T1 (а) и PDFS (б) изображения, показывающие отрывной перелом межмышцелкового возвышения большеберцовой кости в области прикреплении передней крестообразной связки к большеберцовой кости (стрелка) и перелом проксимального отдела большеберцовой кости (пунктирная стрелка).

tra-capsular fractures. This is the first reported case of LPH in the lateral aspect of the posterior femoral recess of the knee.

**Conflict of interest.**

We declare that are no financial interest and no conflict of interest exists.

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