PBL team **med433**

Third case

I dream to join the national team

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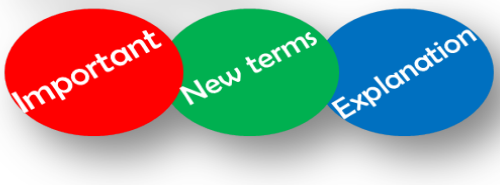

Key points from scenario:

- Ahmed is a 21-year old medical student
- He is a member of college of medicine football team.
- During semi-final match, he was attached by two opponents and one of them fall across ahmed's weight-bearing left leg
- Ahmed was carried out of the field and was unable to continue the match, received first-aid care (Ice and bandage around the knee).
- Next morning he noticed that his left knee is swollen and painful.
- He felt that something was taken out of place in his lift knee
- Although he took 2 tablets of paracetamol, (the pain continued)
- He said that he felt a sudden pop during the attack.
- He felt the pain particularly on walking and he isn't feverish.

Knee examination:

- No bruises or external wound
- Left knee is swollen, tense and the range of movement is limited by pain
- Palpation of the left knee reveals moderate tenderness over medial joint line

Both Lachman and Mcmurray's tests were of limited value because of severe pain and swelling

Investigations → results

- Plain X-ray of the left knee → no fractures or any other pathology.
- MRI-scan of the left knee → tear of the medial meniscus , damage of the anterior cruciate ligament (ACL) also there is collection of blood in the knee cavity(hemarthrosis) .

Diagnosis:

Damage of the anterior cruciate ligament.

Management:

1. Surgical procedure called (Arthroscopy).
   He is encouraged to do weight-bearing activities.
2. He is referred for physiotherapy to reduce the swelling.
3. He is placed on a lengthy rehabilitation program to restore the strength of his quadriceps and hamstring muscles.

Anatomical structures forming the knee joint:

1- Skin and subcutaneous tissue
2- Bones: tibia, patella and femur
3- Articular cartilage

Ligament:
- anterior cruciate ligament (ACL).
- posterior cruciate ligament (PCL).
- medial collateral ligament(MCL).
- lateral collateral ligament(LCL).

4- Menisci:
- medial meniscus (more liable to injury)
- lateral meniscus

5- Arterial supply and venous drainage
6- Nerve supply

Functions of:

- **(ACL)**→ Prevents posterior displacement of femur on tibia.
- **(PCL)**→ Prevents anterior displacement of femur on tibia.
- **(MCL)**→ It resists forces from the outside of the leg.
- **(LCL)**→ resists forces from the inner side of the knee.
- **Menisci** → Deepen articular surfaces of tibial condyles and Serve as cushions between tibia & femur.

Possible causes of swollen knee:

1) Tendency to bleeding (less likely)
2) Trauma to blood supply (more likely)
3) Knee effusion (less likely)
4) Damage to the structures forming the knee joint (more likely)

Possible mechanisms underlying the knee injury:

- Valgus Vs varus strain.
- Direct trauma to the knee.
- Twist of the knee.
- Hyperextension of the knee.

Valgus: condition in which a bone or joint is twisted outward from the center of the body.

Varus: the opposite deformation, where the twist is toward the center of the body.

Comparison between COX1 and COX2

Difference in:	Cox1	Cox2
Availability	Constitutive (present normally)	Inducible (in case of inflammation)
Location	Stomach, kidney, intestine and endothelium	Inflammatory sites (macrophages)
Stimulated by	Physiologic stimulus	Inflammatory stimulus
Perform	Physiologic function	Inflammatory function
Convert arachidonic acid to	PGE2*, PGI2, TX* A2	Inflammatory PGs, proteases, O2

PG: Prostaglandins TX: Thromboxane

Conclusion from the table above:

1- Both (COX1, COX2) are inhibited by NSAIDs (Non-steroidal anti-inflammatory drugs)
2 - As it performs physiologic function, the inhibition of COX1 is undesirable
3- As it performs inflammatory function, the inhibition of COX2 is desirable.
4- As a result, selective COX2 inhibitor drugs have developed which considered to be more potent
5 - COX1 and COX2 have the same affinity to arachidonic acid

Questions:

what the normal range of movement of knee joint ?

Flexion – extension and (and small rotation in locking and unlocking)

What are the main differences between the knee joint and hip joint?

Hip joint	knee joint
Is a ball-and-socket joint surrounded by ligaments, strong muscles and bursae. The joint is weight bearing and has both high intrinsic stability and a wide range of motion.	Is a hinge synovial joint, weight-bearing joint that is important for walking, standing, bending, stooping and squatting. The knee is rather unstable and depends for support on ligaments and strong muscles.

Why the cortisol injection isn't helpful for him?

Cortisol is a strong anti-inflammatory agent, and the inflammatory process in this case is not a major cause of Ahmed's symptoms so, we should concern about treating the deformity in the ligament (which is more serious and responsible for the inability) by surgical involvement (Arthroscopy) .

New terms you should know:

Anterior cruciate ligament (ACL): is a cruciate ligament which is one of the four major ligaments of the human knee.
Opponent: A person with the other team
weight-bearing left leg: Putting weight on your affected (weaker) leg
Sudden pop: sudden sharp explosive sound
Taken out of place: Removal of something
Tense: Stretched tight or rigid
First-aid care: The initial care for a patient
Bleeding tendency: Abnormal susceptibility to bleeding.
Limo on walking: walking with difficulties. Because of damaged or stiff leg or foot.
Tenderness: sensitivity to pain (when touching)
Mcmurray's test: Aims at assessing the integrity of Menisci
Lachman test: Aims at assessing the integrity of the anterior cruciate ligament
Menisci: cartilaginous tissues that provide structural integrity to the knee
Cortisol injection: IV injection of Cortisol
Palpation: Examining by touch
Bruises: an injury appearing as an area of discolored skin on the body, caused by a blow or impact rupturing underlying blood vessels
Hemarthrosis: is a bleeding into joint spaces
Fracture: is the separation of an object or material into two or more pieces, under the action of stress.

Arthroscopy (also called arthroscopic surgery): is a surgical procedure in which an examination and sometimes treatment of damage of the interior of a joint is performed using an arthroscope, a type of endoscope that is inserted into the joint through a small incision.