

W. G. MCD AVID*

PENETRATING WOUNDS OF THE KNEE JOINT

Penetrating wounds of the knee joint, common in the Gold Mines of the Witwatersrand are discussed including the mechanism of injury, first aid, surgical treatment, post operative treatment and follow up. The author gives results of treatment in 50 cases with details regarding three cases.

Penetrating wounds of the knee joint are a common injury met with in the surgery of trauma on the Gold Mines of the Witwatersrand.

On a mine employing approximately 12,000 African Labourers we dealt with 61 cases of this type of injury during the year 1951.

At one time these conditions were responsible for a considerable loss of working time and permanent disability, but in no injury with which we deal has the effect of modern drugs and a simple but meticulous regime of First Aid and Surgical treatment been seen to better advantage.

It may, therefore, be of interest to describe the methods of treatment in detail:

Mechanism of Injury

Practically all of these wounds are caused by rock which, either falls from the working face or from the roof, or rolls or slides along the floor, the slope of the floor being about 45 degrees. The rock has often an almost razor sharp edge and the wounds therefore tend to be incised in nature and not badly lacerated, but they are usually grossly contaminated with small fragments of rock. For the same reason the wound into the joint cavity is not usually associated with any major damage to bone, ligaments or joint cartilages.

First Aid

Approximately 15% of our African labourers are trained in First Aid methods and we also try to emphasize by verbal propaganda, by posters and by bonus schemes of various kinds the importance of early treatment for all types of injury. We specially emphasize that all wounds in the region of the knee joint, no matter how trivial they appear, should be attended to immediately. This attention consists of covering the

* Senior Mine Medical Officer, Rand Mines of the Witwatersrand, Johannesburg.

wound with a sterile dressing, splinting the limb and sending the patient to hospital on a stretcher. The time taken to get a patient from his working place to hospital is on an average, about two hours, so that surgical treatment is normally started before infection has had time to develop.

Surgical Treatment

All cases in which we consider that the synovial cavity has been opened are treated surgically under anaesthesia, even if the skin wound appears to be trivial.

Local regional anaesthesia with 1% Procaine is adequate in most cases unless there is considerable associated injury of bones or ligaments in which case we use spinal or general anaesthesia.

The wound is first irrigated with normal saline in large quantities – some pints being used for a large contaminated wound and this is conveniently done from a douche can, suspended over the table.

Debridement of the wound is then carried out. We have abandoned block excision of all the tissues down to the capsule but are content to remove lacerated and contaminated tissues.

The rent in the joint capsule is not enlarged nor the synovial cavity explored any more than is absolutely necessary to remove fragments of rock.

The capsule is now accurately sutured with catgut – the wound dusted with sulfanilamide powder and the skin closed with silk around a rubber drain.

At one time, Penicillin was injected into the joint at the primary operation, after closure of the capsule, but no advantage was noted in control of sepsis and our impression was that it increased the synovial reaction. This has therefore been stopped.

Post Operative Treatment

The leg is nursed on a splint of the BÖHLER type which allows for a few degrees of flexion and continuous traction is applied by attaching a weight of about 5 lbs. to the foot. Penicillin is administered intramuscularly in doses of 500,000 units per day. Slight pyrexia is common for three or four days following operation and is ignored. When the temperature has been normal for 48 hours, Penicillin is stopped. Exercises for the Quadriceps muscles are started at this stage, flexion is allowed shortly afterwards, and before the end of two weeks the patient is walking, assuming of course that there is no gross damage to bones or ligaments. Persistence of pyrexia after about the fourth or fifth day associated with increasing tenderness of the joint indicates infection. These signs – particularly if the synovial cavity is tensely distended are taken to be indications for aspiration of the joint. This is done through a large bore needle and Penicillin – 100,000 units is injected into the joint. This process is repeated daily until infection subsides which it usually does in a few days. Destruction of the joint by infective arthritis has been in such cases extremely rare and it is today almost never necessary to lay the joint open and drain it.

The question of when to start exercising a joint in which there has been infection is a difficult one and we are guided by the response of the individual patient. A rise in temperature or increased pain in the joint when exercise is started being an indication for further rest. Provided that the joint surfaces are kept separated by slight traction a considerable range of movement is usually obtained even after infection has occurred.

After Treatment

A certain degree of synovitis is almost the rule for some weeks after injury and during this period it is important to exercise the quadriceps muscles. Wasting of the Quadriceps occurs very quickly and when this has happened it is very difficult to restore to full function. To all intents, all of our patients are manual labourers and their work involves walking over rough surfaces and climbing rock slopes and ladderways underground. We cannot therefore return them to this type of work until the joint is completely normal. In the interim between discharge from hospital and return to normal work they are employed in light manual labour on the surface and during this period are under medical supervision.

It is difficult to produce statistics of the results of treatment in these cases, due to the fact that injuries are often multiple. However, in a recent series of 50 consecutive cases in which the penetrating wound of the joint was the predominating injury the average period away from work was 32 days. Three patients at the end of their period of treatment were not considered fit to return to their previous work and were given work on the surface of the mine – the others all returned to their previous employment as underground labourers. An analysis of these three cases shows that:

Case I, was under treatment for three months. At the end of this period his knee flexion was 100° , extension was full but there was still thickening of the joint and some synovitis.

Case II, was under treatment for $2\frac{1}{2}$ months. He then had full movement of the knee but there was thickening of the joint and crepitus on movement. Walking was good.

Case III, was treated for $2\frac{1}{2}$ months and still had thickening of the joint and synovitis. Flexion was less than 100° but walking was fair.

Summary

1. Penetrating wounds of the knee joint are common on the Gold Mines of the Witwatersrand.
2. A simple method of treatment is described.
3. Results of treatment in 50 cases are given with details of 3 who were left with permanent disability.

*Rand Mines, Ltd., Health Department
Johannesburg*

W. G. McDAVID

DUBOKE OZLJEDE KOLJENOG ZGLOBA

Duboke ozljede koljenog zgloba su uobičajene povrede, s kojima se susreće kirurgija ozljeda u witwatersrandskim rudnicima zlata.

Na približno 12.000 radnika-Afrikanaca, koji rade u jednom rudniku, bilo je u toku 1951. g. 61 povreda te vrste.

Nekada su te ozljede uzrokovala znatan gubitak radnog vremena i stalnu nesposobnost, ali djelovanje modernih lijekova i jednostavan, ali do detalja razrađen sistem prve pomoći kao i kirurški zahvati nisu se ni pri jednoj vrsti ozljeda, koje ulaze u naš djelokrug, pokazali tako uspješni kao u ovoj vrsti ozljeda.

Bit će stoga od interesa, da se detaljno opišu metode liječenja.

Mehanizam ozljeda

Praktično su sve te ozljede uzrokovane kamenjem stijena, koje se odronjava s radnog mjesta ili stropa, ili se kotrlja i klizi niz tlo, koje je nagnuto oko 45°. Kamenje ima često oštre bridove poput britve, tako da su rane duboko urezane, a ne jako raskidane, i obično su u velikoj mjeri zagađene komadićima stijene. Zbog tog istog razloga ozljeda u zglobnoj šupljini nije obično vezana ni s kakvom većom povredom kosti, tetiva ili zglobne hrskavice.

Prva pomoć

Oko 15% naših radnika-Afrikanaca izvježbani su u metodama prve pomoći. Osim toga pokušavamo preko usmene propagande, oglasa i nagradnih natječaja raznih vrsta istaknuti važnost ranog liječenja svih vrsta povreda. Naročito ističemo, da sve ozljede u području koljenog zgloba, bez obzira na to, kako bezazleno izgledaju, treba uzeti u postupak neposredno. Taj se postupak sastoji u tome, da se rana pokrije sterilnim povojem, noga ili ruka obloži daščicom i bolesnik na nosiljci prenesu u bolnicu. Prijenos bolesnika s njegova radnog mjesta u bolnicu traje po prilici 2 sata, tako da do kirurškog zahvata normalno dolazi prije, nego što se infekcija može razviti.

Kirurški zahvat

Pri svim slučajevima, gdje smatramo, da je sinovijalna šupljina otvorena, primjenjuje se kirurški zahvat uz anesteziju, čak i ako se kožna ozljeda čini neznatna.

Lokalna anestezija s 1% prokaina je dovoljna u većini slučajeva, ako nema ozljede kosti ili tetiva. U tim slučajevima upotrebljavamo lumbalnu ili opću anesteziju.

Rana se najprije ispere velikim količinama normalne fiziološke otopine - nekoliko litara za veliku zagađenu ranu, i to je najzgodnije da se radi pomoću kablice s lijevkom obješene iznad stola.

Tada se izvrši čišćenje rane. Mi smo napustili odstranjivanje cjelokupnog tkiva sve do čahure, te nam je dovoljno, da odstranimo razrezano i zagađeno tkivo.

Raspuklinu u zglobnoj čahuri ne proširujemo niti pregledavamo sinovijalnu šupljinu više, nego što je apsolutno nužno, da se odstrane komadići kamena.

Čahura se sada pomno sašije ketgutom, rana zapraši sulfanilamidskim praškom i koža zatvori pomoću svile oko gumene cijevi za drenažu rane.

Nekada se pri primarnoj operaciji, nakon zatvaranja čahure, uštrcavao penicilin u zglob. Međutim nije opaženo, da bi to s obzirom na sepsu bilo korisno, a imali smo utisak, da povećava sinovijalnu reakciju. Zato smo to napustili.

Postoperativno liječenje

Noga se liječi na jednoj daščici tipa Böhler, koja dopušta pregib od nekoliko stupnjeva, i noga se stalno priteže utegom od oko 2 kg. Penicilin se daje intramuskularno u dozama od 500.000 jedinica na dan. Prva 3-4 dana nakon operacije javlja se obično lagana pireksija, ali se o tome ne vodi računa. S penicilinom se prestaje, kad temperatura kroz 48 sati ostane normalna. U toj se fazi počinje s vježbama kvadricepsa, kratko nakon toga dopušta se pregib i, prije nego što prođu 2 nedjelje, bolesnik već hoda, dakako, ako se nije radilo o većim povredama kosti ili tetiva. Preostatak pireksije nakon četiri ili pet dana, u zajednici s povećanom mekoćom zgloba, ukazuje na infekciju. Ti se znaci, pogotovu ako je sinovijalna šupljina proširena, uzimaju kao indikacija za aspiraciju zgloba. To se čini velikom šupljom iglom, i 100.000 jedinica penicilina se uštrca u zglob. To se ponavlja svaki dan, sve dok ne nestane infekcije, a to se obično dogodi za nekoliko dana. Razaranje zgloba zbog infektivnog artritisa je u tim slučajevima vrlo rijetko i danas gotovo nikada nije potrebno puštati zglob otvoren i drenirati ga.

Na pitanje, kada treba započeti vježbanjem zgloba, koji je bio inficiran, vrlo je teško odgovoriti. Mi se ravnamo prema reakciji pojedinog bolesnika. Ako se pri početku vježbanja pojavi temperatura ili povećaju bolovi, to je indikacija za produženje mirovanja. Pod uvjetom, da se površine zgloba održavaju odijeljene pomoću lake vuče, obično se dobiva velika mogućnost kretanja, čak i nakon pojave infekcije.

Rekonvalescencija

Gotovo je pravilo, da kroz nekoliko tjedana poslije ozljede postoji u izvjesnoj mjeri sinovitis. U tom razdoblju potrebno je vježbanje kvadricepsa. Atrofija kvadricepsa nastaje vrlo brzo, i ako se to dogodi, vrlo mu je teško povratiti njegovu punu funkciju. U svakom slučaju svi naši bolesnici su manualni radnici i njihov rad uključuje hodanje po neravnom terenu i penjanje po kamenim kosinama i ljestvama pod zemljom. Mi ne možemo prema tome te radnike vratiti na tu vrstu posla, sve dok zglob nije potpuno normalan. U međuvremenu, pošto su otpušteni iz bolnice i opet primljeni na normalni posao, oni se zaposluju laganim manuelnim radom na površini i kroz to su vrijeme pod liječničkom paskom.

Teško je dati statističke podatke o rezultatima liječenja tih slučajeva, budući da su povrede često višestruke. Međutim, u nedavnoj seriji od 50 slučajeva, gdje su prevladavale duboke ozljede zgloba, iznosilo je prosječno izbijanje s posla 32 dana. Tri bolesnika nakon završenog liječenja nisu smatrana sposobnima da se vrate na svoj prijašnji posao, već su dodijeljeni na posao na površini rudnika, dok su se ostali vratili na svoj prijašnji posao kao radnici pod zemljom. Analiza ta 3 slučaja pokazuje, da je:

Slučaj I bio na liječenju 3 mjeseca. Na kraju liječenja bio je pregib koljena 100°, rastezljivost je bila potpuna, ali je još postojalo odebljanje zgloba i laki sinovitis.

Slučaj II je bio na liječenju 2 i pol mjeseca. Poslije toga je mogao kretati koljenom, ali je zglob još ostao odebljan i pri pokretu je pucketao. Hodanje je bilo dobro.

Slučaj III je bio liječen 2 i pol mjeseca i zglob je još uvijek bio zadebljan, a postojao je i sinovitis. Pregib je bio manji od 100°, no hodanje je bilo prilično dobro.

Sadržaj

1. Duboke rane na koljenom zglobu su običajna pojava u rudnicima zlata u Witwatersrandu.
2. Opisana je jednostavna metoda liječenja.
3. Prikazani su rezultati liječenja 50 slučajeva s detaljnim podacima o 3 slučaja, koji su uzrokovali trajnu nesposobnost.

*Rand Mines, Ltd.,
Health Department,
Johannesburg*