

TRAUMATIC DISLOCATION OF THE KNEE

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SUMMARY

This study analyses retrospectively the results of sixteen acute dislocations of the knee at the University Hospital, Kuala Lumpur from 1980 to 1985. The average follow-up was 3.5 years. There were seven posterior, six anterior, one lateral and two postero-lateral dislocations. All were due to motor vehicle accidents except one. There were four patients with popliteal artery injury and two patients with peroneal nerve injury; three required amputations due to late detection. All the peroneal nerve palsies were permanent. The results of surgical treatment appear to be better than conservative management of acute dislocation of the knee.

INTRODUCTION

Traumatic dislocation of the knee is an uncommon but serious injury associated with extensive soft tissue damage and danger of neurological and vascular complications. The rarity and seriousness of the injury is reflected by Sir Astley Cooper's statement in 1924 "Of this I have only seen one instance and I conclude it, therefore, to be a rare occurrence and there are scarcely any accidents to which the body is liable which more imperiously demand immediate amputation than these." This earlier pessimism has changed over the years as more published articles have increased the awareness of the importance of prompt diagnosis and management of resulting complications. The aim of this study is

to analyse the results of acute dislocations of the knee at the University Hospital.

PATIENTS AND METHODS

The records of all patients with acute dislocations of the knee at the University Hospital, Kuala Lumpur, from 1980 to 1985 were retrospectively analysed. There were 20 patients out of whom 16 who had complete records, radiographs and adequate follow up, were suitable for study. There were fourteen males and two females. Their ages varied from 17 years to 38 years with an average of 24 years. The average follow up was 3.5 years, ranging from one year to six years. The cause of dislocation was a motor vehicle accident in all except one where it was due to a heavy object falling on the knee.

There were six anterior, seven posterior one lateral and two postero-lateral dislocations (Fig. 1). All but one were closed dislocations. Eight of the patients had associated fractures; two fractures of the medial femoral condyle, one fracture of the lateral femoral condyle, two fibular head fractures, two tibial plateau fractures, and one superior tibio fibular joint dislocation.

The mode of treatment was conservative in ten patients. This consisted of immediate closed reduction under general anaesthesia followed by application of a posterior plaster of Paris slab for one week, during which time the limb was observed for vascular compromise. This was followed by application of a long leg plaster of Paris for the next five weeks. At the end of six weeks of immobilisation, the plaster was removed and knee mobilisation and muscle strengthening exercises were started.

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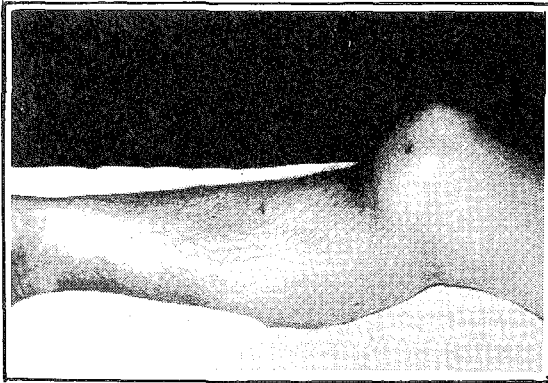


Fig. 1a Photograph of 35 years old Chinese male involved in motorvehicle accident showing posterior dislocation of the knee. Note bruising anterior aspect of upper part of the leg.



Fig. 1b Radiograph of the patient in Fig. 1a showing posterior dislocation of knee with fracture of upper tibia.

Surgical treatment was carried out in six patients. This consisted of repair of the medial collateral ligament in three patients, lateral collateral ligament in two patients, posterior cruciate ligament in two patients, anterior cruciate ligament in two patients, and patella tendon in two patients. In addition, four patients had capsular plication. One dislocation was not reducible by closed methods and hence open reduction with repair of the ligaments was carried out. The indications for ligament repair in the other cases were not specified (Table 1). Post-operatively, the limb

was immobilised in a long leg plaster of Paris and the patients were mobilised non-weight bearing. At the end of six weeks the plaster of Paris was removed and active knee mobilisation and quadriceps strengthening exercises commenced.

TABLE I
SUMMARY OF SIXTEEN ACUTE KNEE DISLOCATIONS

type of dislocation	Anterior	Posterior	Lateral	Postero Lateral
Number of cases	6	7	1	2
Number of open dislocation	1	—	—	—
Popliteal injury	1	3	—	—
Nerve injury	1	1	—	—
Closed reduction	5	3	1	1
Ligament repair	1	4	—	1

RESULTS

The results were evaluated according to the criteria set out by Taylor et al.¹

Good: A stable painless knee with more than 90 degrees of flexion.

Fair: A slight instability on straining, no pain flexion from 60–90 degrees.

Poor: All others.

Of the ten patients treated conservatively, four had good results, two had fair results, and four poor results. Of the six treated surgically, four had good results, one fair, and one a poor result. Complications encountered were a popliteal artery injury in four patients. One was detected immediately in the casualty department.

Three other patients were referred late after a popliteal artery injury. Two of them had above knee amputations and one of them died later from septicaemia and disseminated intravascular coagulation. The other patient had gangrene of the toes at the time of referral and the arteriogram showed complete popliteal artery obstruction at the adductor hiatus.

Two patients had peroneal nerve palsy which did not recover even after two years. The frac-

tures were treated on their own merit. The fracture of the patella, medial and lateral femoral condyles and tibial condyle were treated by internal fixation.

DISCUSSION

Acute traumatic dislocation of the knee being a rare injury limits the experience that any one orthopaedic surgeon can have in the management of this type of injury. Our knowledge is based on the collective data published in literature by several authors. The morbidity and mortality following acute dislocation of the knee has reduced over the years because of increased awareness of the incidence of popliteal artery injury, which has been reported to be as high as 45%.² In our study the incidence was 25% (four cases) and in these two cases there were two above knee amputations. One patient died from septicaemia and disseminated intravascular coagulation. In the third patient, the limb survived but this patient had gangrene of the toes. This was so because the collateral circulation was sufficient to maintain the viability of the limb. Debakey³ noted that during World War II when popliteal vessel ligation was carried out, gangrene occurred in 72% of the cases. In all the above three cases the diagnosis was initially missed by doctors who referred these cases to the hospital; probably because of unawareness of the potential seriousness of dislocation of the knee. The fourth case was seen in the casualty shortly after the injury and prompt diagnosis and appropriate remedial action was successful in saving the limb.

The clear-cut mechanism of injury in most cases is not evident. Most often it is conjectural. In all our cases, except one, the dislocation resulted from injury sustained following motor vehicle accidents. In nine out of fifteen cases the injury was in pillion riders, others were motorcyclists. In one, the injury was due to heavy weight falling on the knee. In none of these, the precise mechanism of dislocation was known. Kennedy⁴ has done the only experimental work available on the mechanism of injury in dislocation of the knee. He showed that anterior dislocation was produced by hyperextension of the knee.

There is a tear of the posterior capsule at 30 degrees of hyperextension, followed by rupture of the posterior cruciate, followed by dislocation. Rupture of the popliteal vessels occurred at fifty degrees of hyperextension. However, this may not be true under dynamic situations in patients. Posterior dislocation was difficult to produce. Troques of 650-800-inch pound were needed to do so. He noted that patella tendon rupture occurred always. Medial and lateral dislocation were difficult to produce and they were often associated with fractures of the tibia or femur. Kennedy's clinical observation suggested the following:

- a. Anterior dislocation occurs from trivial to violent injury with hyperextension of the knee.
- b. Posterior dislocation occurs from crush injury.
- c. Medial and lateral dislocation occurs with extension forces usually with a lateral and rotatory stress.

According to Kennedy, anterior dislocation was by far the commonest and has a higher rate of vascular problems. In our study, the number of posterior dislocations were slightly more than anterior dislocations. This was probably because most of the injuries in our study were due to a crushing force as a result of motor vehicle accidents.

The incidence of peroneal nerve palsy has been reported to be as high as 35% by Shileds.² In our study the incidence was 15%. Injury to nerve is usually extensive and prognosis for functional recovery is usually poor. Meyers⁵ had six peroneal nerve palsies in eighteen dislocations, four of them were explored; however, all of them were permanent. In our study in both cases the peroneal nerve palsy was permanent too; after two years of follow-up no recovery occurred.

There is no unanimity in literature regarding the best method for treatment of dislocation of the knee with regards to the management of the ligamentous injury. Rockling and Peltier 1969,⁷ Taylor 1972,¹ and Trickey 1976,⁶ claim good

results with conservative treatment. However, Meyers 1975⁸, Shields 1969² and Wright 1978,⁹ claim results are superior with operative treatment. However, there remains no controversy with regards to operative intervention when there is an open dislocation, an irreducible dislocation (usually postero-lateral) or an injury to the popliteal vessels. In our study, of the ten patients treated conservatively, four had good results, two fair and four poor results. In the group treated by surgery, four had good results, one fair and one poor result. The two groups in our study may not be comparable because all the patients that were referred late belonged to the conservative group, although, the results of those treated operatively appear to be better. The group that was treated conservatively were those in the earlier years and toward the later part of the study most of the cases were treated operatively. The authors believe from their experience that operative repair of the ligaments primarily without any augmentation procedures, provided there are no contraindication at that stage, gives better results than conservative treatment for the ligamentous injury in acute traumatic dislocation of the knee. However, if conservative treatment is opted for whatever reason and proper muscle rehabilitation fails to restore functional stability, surgical reconstruction should be carried out on an elective basis. Thanks go to our colleagues who allowed us to help in the preparation.

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