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REVIEW ARTICLE

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Total Knee Replacement in Hemophilic Arthropaties

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ABSTRACT

In severely affected haemophilic patients arthropathy is a common problem which can lead to considerable pain and functional deficit.

Surgical management, including total knee arthroplasty, can be undertaken if conservative management fails. A search of literature showed a number of studies describing the use of total knee arthroplasty. The paper reviews the functional outcome of arthroplasty in knee joint, the postoperative and long-term complications. Although complications are commonly described and the surgery is technically demanding, the results suggest that arthropathy, particularly of the knee, can be a valuable option in the management of severe haemophilic arthropathy. In this review, there are not outcomes and figures.

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Introduction

It is well known that patients with haemophilia can present with severe joint distruction in adult life as a result of haemophilic arthropathy. It is commonly multiarticular, affecting shoulders, elbows, knees and ankles. Consequently, the haemophilic patient commonly complains of pain and severe functional deficit related to one or severe joints. Conservative management, including analgesia, physiotherapy, orthotics, and advice on joint care may be sufficient to alleviate symptoms in many cases. If these measures fail, then surgery may be considered. This paper will review the use of total knee arthroplasty in patients with haemophilia.

Total Knee Arthroplasty

The knee is the target joint in the majority of hemophilic patients and end stage arthropathy is often very painful and disabling [1-3]. The first report of total knee arthroplasty (TKA) in patients with haemophilia date back to the mid-1970s.

Outcome of TKA

Early reports of results of TKA were promising with good pain relief and no complications although limited flexion was noted in one case [4].

However few details of outcome were available, numbers were small and follow-up short [4, 5]. In the late 1970s and early 1980s, larger series of TKAs began to be described, and more formal methods of assessing outcome began to be used. Two studies used the University Hospitals of Cleveland knee rating form [6-9]. Many other studies have used the Hospital for Special Surgery (HSS) knee rating scale to assess outcome. This includes an evolution of pain, function, range of movement, strength and stability [10]. Insall et al acknowledged that patients with multiple joint involvement may have worse postoperative scores. Despite this, results of reported studies in hemophilic patients are mainly in the good or excellent categories [10].

Lachiewicz et al described the results of 24 TKAs implanted in 14 patients. Using the HSS knee rating scales, results were described as excellent in 15 knees, good in six, fair in one, and poor in two [7].

Kjaersgaard-Andersen et al reported that 75% of their patients (nine knees) had an excellent result and 25 % (three knees) had a good result using the same scale. This excluded a patient who was HIV- positive and died 3 months after surgery [11].

No deep infections or aseptic loosening occurred. Magone et al evaluated the results of nine TKAs in seven patients with a mean follow-up of 4.4 years [12]. Five knees were rated as excellent and four had a good result.

One TKA was a revision of a prosthetis inserted 6 years previously which had become loose. Even in cases where not all the all the results were rated as excellent or good, the preoperative pain markledly improved.

While pain relief is almost always achieved postoperatively, occasionally patients had a prolonged recovery with pain that was slow to seattle [13].

However, the range of movement achieved postoperatively is more variable.

Range of Movement

In patients with haemophilia, loss of range of movement can be a problem following TkA. Luck and Kasper identified a loss of Rom in patients with two-compartment prosthetes, but an increase in range in three-compartment prosthetes with use of

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CPM from the fifth day postoperatively and manipulation under anaesthetic (MUA) in selected cases [3]. It was noted that the used of CMP immediately postoperatively appeared to be associated with increased bleeding.

Figgie also noted a lower mean Rom following TKA without patella resurfacing. Others authors identified an increase in range postoperatively. Lachiewicz et al recordered a mean increase in Rom of 23° with improvements in both flexion and extension [7, 9]. In their early cases manipulation was performed if the patients had not achieved 90° by the third postoperative week. In their latter cases, manipulation was performed as part of a protocol for postoperative management.

Kjaersgaard-Andersen et al considered manipulation if the knee could not be flexed beyond 70° preoperatively which increased to 83° at follow-up [11]. Goldberg et al included MUA in the second week in four arthroplasties but as no appreciable increase in motion was obtained, the technique was discarded [8]. The overall arc of movement increased 13° with a particular improvement in the flexion contracture. Karthaus and Novakova identified a mean 20° increase in arc of movement [14]. Eight of the knees were manipulated in the second or third week postoperatively. They concluded, however, that manipulation was inappropriate as it delayed healing, caused pain and required additional factor replacement. They also noted that while marked flexion contractures were not a contra-indication to surgery, the operation may be more difficult and the results less optimal.

In a study of ten patients, McCollough et al identified variable results in range postoperatively [6]. One knee increased range, six lost movement and three had the same arc of movement as preoperatively. The mean increase in extension was 6.5°, with a loss of flexion of 15°. There was no mention of the use of MUA in the postoperative period.

Wiedel et al in a multicentre review of 76 patients with 93 TKAs, noted that although the arc of movement only improved marginally, the flexion contracture improved more and the available movement was therefore more functional [15]. Magone also identified an improvement in the flexion deformity. They reported on nine TKAs in seven patients [12].

There was a mean increase in arc of motion of 30° postoperatively, the flexion deformity mean preoperatively was 21° and this reduced to 8° postoperatively.

Teigland et al also reported a decrease in flexion contractures postoperatively but a reduction in flexion range, the overall arc of movement being unchanged [16]. Unger et al reported that the arc of movement was increased in 23 of their 26 TKAs, mean 28° [17].

Three knees lost range. Thirteen of the joints had manipulation to improve range. Heeg et al performed MUA due to limited range of motion postoperatively in two patients [13]. Rodriguez-Merchant and Wiedel in a retrospective study of 37 TKAs identified that an MUA was less often required in those patients who had their TKA after 1986 [18]. The authors hypothesized that this may be due to higher levels of factor replacement postoperatively, allowing more active rehabilitation.

Range of movement achieved in the early postoperative period may be maintained in the longer term due to soft tissue changes [19]. Rana et al, noted that in one patient with TKA, the range of movement achieved postoperatively was diminished after 6 months with a return of flexion deformities [20].

Surace and Pietrogrande described a patient with only 20° flexion preoperatively, which increased to 40° postoperatively, but reduced again within 3 months [21]. Manipulation under anaesthetic and exercices restored the range to the immediate postoperative level. In a review of 21 TKA in 16 patients by Cohen et al, two patients had developed fibro-arthrosis when examined a year after surgery [19].

MUA Restored Range to 90° which was Maintained

The main improvement identified in the studies was an improvement in flexion contracture associated with a more functional, energy-sufficient gait. The stage of joint degeneration, soft tissue contractures and type of prosthetis may account for some of the variation in the range of movement achieved postoperatively [11, 22].

MUA was performed to increase range of movement in a number of studies, however, other authors considered that it did not change range and may increase pain and delay healing [3,7,8,11,13,14,17]. If carried out, it was usually performed within the first 2-3 weeks postoperatively although MUA even 1 year after surgery was still reported to be beneficial [19].

In cases where there was severe loss of movement, necessitating a tibial tuberosity osteotomy in order to access the joint, manipulation was not appropriate [11]. The technical problems of TKA are considerable and include difficult exposure of the joint, lack of bone stock, deformities, quadriceps contracture, adhesions and soft tissue contractures [7-9]. These factors may influence the range of movement achieved.

Complications Following TKA

Most TKA studies report a number of complications. Preoperative complications secondary to factor replacement included Coomb-positive haemolysis, haemolytic anemiae, development of an inhibitor and anaphylactic reaction. Other complications were related to the operation, such as haemarthroses, haemartoma which required

evacuation, low grade infections which settled with intravenous antibiotics and wound breakdown. Other problems also occurred during the postoperative period, including gastro-intestinal bleeding, epixtasis, urinary infection, recurrent phlebitis at the site of venous puncture and fever of unknown cause of a few days duration [3,6,7,11,13-16].

Complications described by Goldberg in a report of 13 TKAs in ten patients were quite extensive and included three cases of postoperative bleeding, one of which was associated with a deep infection that ultimately required arthrodesis [8]. A second patient had recurrent bleeds which resolved following revision of a malaligned tibial component 10 months after the original surgery.

The third case of postoperative bleeding settled without further intervention. There were also five cases of superficial wound infection.

Two patients later required a secondary patella resurfacing procedure due to patellofemoral pain. The authors considered that this should be performed as part of the TKA in order to

improve the outcome.

In three patients, a posterior tibial and three peroneal nerve palsies occurred postoperatively, which may have been related to the increase in extension postoperatively causing stretching of the neurovascular structures. Other studies have also reported partial peroneal nerve palsies [15].

Figgie et al in a longer term follow-up of the previous study discussed possible reasons why six of the 19 TKAs were rated as poor or failures [9].

This included any prosthetic components that were subsequently removed, which were rated as zero. Of seven knees performed under 80% factor replacement under 80% factor replacement cover, four of these failed and six of the seven had complications.

The authors considered that the type of prosthetis used may also have been a factor. Additional complications and further surgical procedures to these described by Goldberg above, included one skin necrosis, one transfusion reaction and four cases of postoperatively bleeding. A further two revisions were performed due to loosening and in one case, removel of a cement spur was required.

The authors also reported a high rate of radiographic lucencies, possibly related to the postoperative bleeding.

Luck and Kasper described an extensive review of 20 years experience of orthopaedic surgery including 46 TKAs [3]. Late complications following TKA included one patient with recurrent haemarthroses in the early months, a complication also described by Magone [12].

In other case, deep infection was associated with dental abscess affecting both replaced joints, which responded to antibiotic therapy.

Two revisions were also performed for aseptic loosening of the tibia/ femoral components.

Results

Total knee arthroplasty is considered the gold standard for the treatment of the end stage chronic arthropaty in hemophilic patients [23,24]. Unfortunately, the reported prevalence of infection ranges from 0 to 17%, which is much higher than the prevalence of 1%-2 % observed after THA in the non hemophilic population, and the rate of prosthetic survival is 90% after 5 years [25-27]. Recently, the mean rate of infection was reported as 6,9, ranging from 1.4 to 11,4 % [24]. In order to obtain a decrease of infection rate with similar outcomes to that of total knee arthroplasty in the general population, the maintenance of high level of clotting factor replacement throughout wound healing has been supported [28]. The effectiveness of the use of antibiotic-loaded cement to prevent the onset of infection After primary total knee arthroplasty in patients with haemophilia is still controversial [29].

Conclusion

After revisioning the literature, the results suggest that total knee arthroplasty can relieve pain and improve function in symptomatic haemophilic patients.

Arthroplasty is technically demanding due to soft tissue fibrosis, contractures and poor bone quality, and complications can be considerable.

It is important for the patients to have realistic expectations of what surgery can offer and the importance of an experienced multidisciplinary team in the management of haemophilic patient is paramount [30]. Despite improvements in medical treatment, arthroplasty remains a problem for many patients. Furtunately, total knee arthroplasty, is a valuable option which can enable the patient to have a painfree joint and improved quality of life.

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