Case report

Early complication after total knee arthroplasty in a haemophilia A patient

Wczesne powikłanie po endoprotezoplastyce stawu kolanowego u chorego na ciężką hemofilię A

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Słowa kluczowe: endoprotezoplastyka kolana, artropatia, hemofilja, krwawienie, powikłanie.

Abstract

Total knee replacement in patients with haemophilia A is a challenging procedure with high risk of complications. Due to the massive destruction of the joint and significantly reduced range of motion, total knee replacement should be performed only by a surgeon with high degree of expertise and experience. During the perioperative period, patients require factor VIII (FVIII) replacement therapy supervised by a haematologist, under control of plasma activity levels. Possible early complications include delayed wound healing, soft tissue and joint bleeding, development of pseudoaneurysm and early infection. Once complications occur, prompt detection and introduction of proper treatment is fundamental.

Streszczenie


Introduction

Frequent, recurrent joint bleeds in patients with severe haemophilia A (factor VIII plasma activity levels < 1 IU/dl) lead to destruction of the joint and rapid development of massive degenerative changes: hemophilic arthropathy. These changes affect not only the articular surface and bone but also the soft tissues of the joint. Synovial fibrosis due to chronic inflammatory changes and a tendency towards antalgic limb positioning cause gradual limitation of range of motion (ROM) – flexion contracture. Reduction of weight bearing of the affected limb leads to muscle atrophy. These changes occur commonly in knee joints, ankles and elbows. Degenerative changes as a result of joint bleeds lead to significant disability [1]. In cases of insufficient replacement of deficient clotting factor, advanced arthropathy may be present in the age range 15–25 years. Patients may often need to use crutches or a wheelchair for locomotion. When arthropathy progresses despite treatment and physiotherapy, the only effective way to treat it is total joint arthroplasty [1–3].

Despite specific, precise guidelines for the treatment of patients with haemophilic arthropathy, total knee arthroplasty is performed rarely and only at specialised centres. The problems usually encountered include the lack of clear orthopaedic recommendations, significantly greater risk of complications and difficulties in creating an experienced team (including haematologist, orthopaedic surgeon, anaesthetist and...
physiotherapist). As well as typical risks and potential complications of joint arthroplasty, complications associated with blood clotting can occur. Surgical difficulties are associated with limitations of ROM and abnormal joint and limb axis. Arthropathy often involves more than one joint; hence, proper planning of the sequence of surgical procedures is the key to success. The recommended sequence is to perform hip replacement first, then knee arthroplasty. Choice of the proper implant is also of paramount importance. Stable implant placement often requires additional bone grafting. Implant survival time may be shorter because of weaker bonding to osteoporotic bone. A higher risk of aseptic or septic implant loosening is noticed. Early wound healing problems are another possible complication. To perform this kind of surgical procedure safely it is necessary to create an experienced team to supervise the patient during treatment. Access to a suitably equipped, specialised laboratory is mandatory.

Case report

A 25-year-old patient suffering from knee arthropathy caused by repetitive joint bleeds in the course of severe haemophilia A was admitted to the Department of Haemostatic Disorders and Internal Medicine of the Institute of Haematology and Transfusion Medicine in Warsaw for preparation for elective total knee replacement. Comorbidities were epilepsy and chronic hepatitis C virus infection (HCV). Patient height was 178 cm, weight 80 kg and body mass index (BMI) 25 kg/m². Advanced knee arthropathy was associated with severe ROM restriction and pain. Range of motion before surgery: extension deficit 10°, flexion 90°. The joint was stable in the frontal and sagittal planes with correct axis of the limb (Figure 1).

Basic preoperative laboratory tests were correct except for a highly elongated activated partial thromboplastin time (APTT) due to the absence of factor VIII (< 1 IU/dl). The most important laboratory test allowing the patient to elective surgical procedure is the test for the presence of factor VIII inhibitor. In the discussed patient, inhibitor of factor VIII was excluded, so there were no haematological contraindications to elective surgery. Two hours before surgery, factor VIII concentrate was administered at a dose of 50 IU/kg [1]. Factor VIII plasma activity 30 min after injection of the concentrate was 104 IU/dl (normal range 50–150 IU/dl); therefore, inherited deficiency of factor VIII was corrected.

The patient was transferred to the Orthopaedic and Trauma Clinic of the Central Hospital of the Ministry of the Interior to perform total knee arthroplasty. The surgery was performed under general anaesthesia in a typical manner (Figure 2). During the operation patella maltracking was noticed and lateral retinaculum was released. Before closing the wound the pneumatic tourniquet was released and meticulous haemostasis was made. Two drains were left in the wound. In the perioperative period (I–II week) factor VIII plasma activity was maintained at a level above 80 U/dl, and was checked every 24 h [4]. Thromboprophylaxis was conducted using nadroparin 0.6 ml subcutaneously every 24 h. For the first 4 days, wound bleeding was noticed with no bleeding into the drains. The drains were removed on the second postoperative day.

Physiotherapy was postponed until day 4, when wound bleeding had stopped. In the following days the correct course of treatment was noticed. An considerable swelling of the knee was present. Narcotic drugs (morphine) were used for analgesia. Non-steroidal, anti-inflammatory drugs were not used due to the potential impact on blood coagulation parameters.

On the 15th day after the surgery slight wound bleeding occurred again, despite maintaining proper FVIII plasma activity (80 U/dl); therefore, there was no indication for modification of substitution of FVIII [4]. Bleeding was accompanied by increasing...

Figure 1. Preoperative X-ray, advanced haemophilic arthropathy

Figure 2. Postoperative X-ray, total knee replacement
Discussion

Replacement of deficient clotting factor is necessary when carrying out orthopaedic operations in haemophiliacs. During the perioperative period, patients receive FVIII concentrate intravenously, maintaining its plasma activity at the level of 100 U/dl within the 1st week, then above 50 U/dl until the wound is completely healed.

In the case of haemorrhagic complications in the perioperative period, the plasma activity of FVIII should be precisely checked. If the activity is too low, the dose should be increased. Excessive bleeding not responding to factor replacement may indicate the development of factor VIII inhibitor. In cases of this serious complication of substitution the treatment should be modified, replacing FVIII concentrate with by-passing agents [2, 3]. It should be noted that if the bleeding occurs at the correct level of FVIII plasma activity, “non-haematological” bleeding causes should be sought – for example, surgical causes of bleeding. One has to be sure that nonsteroidal anti-inflammatory drugs are not in use. In cases of persistent oedema [5] in the distant days from surgery, additional tests to confirm the presence of haematoma in the joint or in the surrounding soft tissues, e.g. ultrasound or angiography, should be considered [6–9]. In our patient, the joint swelling was not bigger than expected after this type of extensive surgery; therefore, additional imaging was not implemented. Arterial bleeding requires inspection of the wound and its careful closure. An additional, and very useful, method can be angiography with embolisation of the injured vessel [7–9]. In the case described above, active arterial bleeding was revealed during haematoma removal. After exclusion of possible haematological causes of bleeding (proper factor VIII plasma activity, excluding the presence of inhibitor), surgical wound inspection was performed without additional imaging (ultrasound, angiography). It can be stated that the bleeding was the result of an intraoperative vascular injury.

Arterial bleeding in a patient with haemophilia A can occur even with normal plasma activity of clotting factor. Further increases in factor concentrate doses are usually useless and may lead to thrombotic complications. In such cases, surgical intervention and wound inspection is required. There are few reports on complications in the form of a postoperative pseudoaneurysm or persistent joint or soft tissue haematoma [7, 10–15]. The recommended procedure is arteriography with embolisation of the injured vessel or surgical wound inspection and closure of the injured vessel under direct vision.

References


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