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Contents

Aims and scope

ONLINE JOURNAL OF HEMATOLOGY AND MEDICINE (OJHM) is an interdisciplinary open access online journal focusing primarily on blood diseases. The journal publishes original contributions in non-malignant and malignant hematological diseases. It also covers all the areas related to the hematological field that takes care of diagnosis and treatment of blood disease. Particular editorial interest is addressed to: Inherited and Acquired Clotting Disorders, Antiphospholipid Syndrome, Clinical Management of Bleeding Diseases, Coagulopathies, Hemophilia, Platelets Disorders, Thrombotic Disorders. Manuscripts should be presented in the form of original articles, editorials, reviews, short communications, or cases report, all submissions are rigorously peer reviewed.

All manuscripts submitted to OJHM must be previously unpublished and may not be considered for publication elsewhere at any time during OJHM's review period.

Cesar A. Garrido

President of the World Hemophilia Association

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Letter to the Editor

Memories of the past, experience for the future

It is undoubted that the World of hemophilia has changed extraordinarily if I compare the times when I joined the WFH as a volunteer in 2000 compared to today, where a landscape of advances that are happening and that will come in the next 3 years at least. Back then we did not even dare to imaging a vision like the current “Treatment for All”. There were very terrible and dramatic moments due to contaminations with HIV and Hepatitis C. There were moments where the news that arrived was that colleagues and friends in the world had died. Times when distrust of the pharmaceutical industry was at its worst. Moments in which some patients, aspiring to receive some financial compensation for the damage suffered from treatment with concentrates that turned out to be contaminated, were forced to sue the doctors treating them since childhood, to support the case in court. I do not miss those moments at all, but I do recognize that it was an episode that had years where established national member organizations (NMOs) and emerging NMOs spoke the same language to society. It did not matter whether it was developed or developing. All argued facing society, facing the health authorities, facing the rulers, facing press, facing the pharmaceutical industry, facing decision makers with the same and common argument “No person with hemophilia or another bleeding disorder should be treated with cryoprecipitate or plasma". All the caregivers and leaders together with the patients monitored and demanded that the new coagulation concentrates must have undergone at least 2 viral inactivation processes, know the origin of the plasma, that they be safe and of high purity in some cases. It was a coordinated fight around the world that in many places elicited reactions from everyone involved in this issue.

What is the current scenario? We have a vision with more than 10 years of establishing "Treatment for all ..." and more recently the comment was added "one day all people with a bleeding disorder will lead a full and productive life”.
On the other hand, we have realities that differ greatly from those of 20 years ago:

- The growth in age of the population
- New technologies / innovations
- What patients and the public expect.

Each of these aspects are challenges that patients and their families, health care professionals, and especially the leaders of national member organizations (NMOs) must face.
The leaders of the organizations have to support health care givers in redesigning their comprehensive treatment strategy for a person with hemophilia (PWH) considering that their life expectancy implies being able to count on the support of a multidisciplinary team with a cardiologist, urologist and even a geriatrician. In most cases and according to the initiative of the WFH, it should also include in its activities and requests to the authorities to considering the diagnosis and treatment of women and girls with bleeding disorders as well as the access to appropriate medications.

The range of therapeutic options and various drugs has an increasing role in modifying the strategy by the leaders of the NMOs together with the care providers to face health authorities. Health leaders must handle carefully the arguments between standard half-life, extended half-life, treatment with NO FACTOR concentrates, new molecules where each one has its cost benefit and cost effectiveness, and also considering we are also entering an era of the functional cure of hemophilia that is obtained with gene therapy.

It is useless still requiring governments to approve that PWH must consume at least one IU when in fact they need to be under prophylaxis, which is the Gold Standard of treatment for hemophilia in both children and adults, consisting of at least 4 IUs. The indicators at present are more suitable for the annual bleeding rate (ABR). This new indicator shows in the end what the patient needs is the possibility not to bleed or to bleed much less and therefore to avoid joint problems.

Decision makers today expect scientific evidence to be shown to support requests from patients and NMOs. The use and management of DATA is essential to convince government authorities.

Last but not least and very challenging, patients ask for what they think is best, what they hear, or think will improve their lives. Patients must not be expected to make decision, since they are receiving confusing information from different sources, such as social networks, posts, publications from different institutions and companies.

The leaders of the NMOs carried out the complicated task of listening to their followers, that is, the patients, primarily and outlining the realities and possibilities in their respective countries and later explaining those needs to the authorities, but not with the usual past requests but rather by using the opposite strategy as a proposal to the decision makers, arguing in a professional way these needs and demonstrating that the authorities can save money if they treat patients as they should.

Leaders are forced to break years of habit, break paradigms and styles and to innovate and argue basing their statements on statistics and health technology assessments.

Hopefully, the whole community, will have the same drive and make the common effort as was done some 20 years ago when everyone fought for everyone else and with a common reasoning and this is that no one should be left behind, that treatment for everyone will finally became a reality.

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Case Report

Simultaneous bilateral total knee arthroplasty in a subject with severe haemophilia A

Abstract

Haemophilia is a rare blood disorder leading to haemorrhages and haemartrosis, and causing the so-called haemophilic arthropathy. Knees, ankles, elbows, and hips are the target joints. Knee arthropathy is specifically the most frequent and particularly debilitating for young haemophiliacs. Total Knee Arthroplasty is the gold standard of treatment in severe cases without relief after conservative treatments. A 51-year-old man affected by severe type-A Haemophilia was treated with a bilateral simultaneous Total Knee Replacement. Surgery was performed under prophylaxis with recombinant factor VIII, antibiotics, and general anaesthesia, after a careful multidisciplinary evaluation and full information to the patient. The outcomes were very good to the complete satisfaction of the patient at almost 10 years after surgery.
To date, it represents the first long-term report about a simultaneous bilateral Total Knee Arthroplasty in our country in a haemophilic patient and one of the very few successful and uncomplicated cases in literature.

Key-words

Total Knee Arthroplasty, Haemophilia, Haemophilic Arthropathy, bilateral joint replacement

Introduction

Haemophilia is an uncommon inherited disorder consisting of a lack of a specific coagulative factor, leading to haemorrhages and haemartrosis in male subjects since childhood [1]. Even though the modern haematological prophylaxis has significantly limited the haemorrhages, articular bleedings represent the most common complication, inducing severe degenerative changes in joints [1,2]. Knee arthropathy represents the most typical pattern: several non-surgical approaches have been reported during the last few years with high rates of success at early stages [3-5]. However, advanced stages may need a Total Knee Arthroplasty (TKA) to ensure relief from pain and functional recovery [6,7]. Haemophilic arthropathy is mostly bilateral but a simultaneous surgery is not generally feasible due to the higher rates of complications related to Haemophilia [8,9]. Thus, a one-stage bilateral TKA should be reserved to selected patients after a meticulous collegial assessment. This is the report of the first bilateral simultaneous TKA performed in our country in a Haemophilic patient with a long-term successful follow-up.

Case report

A 51-year-old man affected by severe A-type Haemophilia (FVIII:C <1%) and non-active C-type hepatitis was seen at our multidisciplinary office after years of treatment with analgesics, viscosupplementation, and a prophylaxis with recombinant FVIII concentrates. He referred a progressive functional impairment and continuous pain during daily life activities. When he was 21 years old, he underwent an open synovectomy on his left knee with acceptable results for several years. Both knees presented a severe flexion contracture,

a varus malalignment with coronal instability, and a symptomatic crepitus. The Range of Motion (ROM) of the right and left knees was 5°-75° and 10°-70° respectively. The Knee Society Score (KSS) at last pre-operative visit was 32 for the right knee, 27 for the left knee [10]. The Petterson score, a radiographic-based scoring system specific for haemophilia, was 11 for the right knee and 12 for the left knee [11]. After a careful assesment of the general health status and given an exhaustive informed consent to the strongly motivated patient, and respecting the principles of the Declaration of Helsinki, the multidisciplinary team decided to perform a one-stage bilateral TKA. The surgical procedure was performed by the Senior Surgeon (MI). The preoperative prophylaxis was conducted by a preoperative bolus of 5000 units of recombinant FVIII concentrate, 1000 mgs of tranexamic acid, and antibiotics (teicoplanin 400 mgs + amikacin 500 mgs). A general anaesthesia was induced; two separate operative draped fields and a tourniquet applied bilaterally, but singularly inflated. On the right knee an anterior longitudinal standard approach and a medial parapatellar capsulotomy were performed. The second surgical phase on the left knee was conducted using the previous scar of the open synovectomy during the wound closure of the other knee (Figure 1). The implant was the Genesis II system (Smith & Nephew, Memphis, TN), chosen for its peculiar features in haemophilic patients, as previously reported [6]. Posterior-stabilized cemented femoral components, fixed bearing tibial components with cemented trays and pressfit keels, and cemented patellar components were bilaterally implanted. The surgical time was 60 minutes for the right knee (tourniquet time: 40 minutes; estimated blood loss: 250 cc), and 70 minutes for the left one (tourniquet: 50 minutes; estimated blood loss: 300 cc). All components were of equal size. At the end of both procedures, wound drains and compressive tapings were positioned (Figure 2). The postoperative management consisted in blood transfusions (two bags) and a tailored haematological prophylaxis. Antibiotics were maintained for three postoperative days and parenteral paracetamol and morphine were also administered. A daily evaluation of blood concentrations of the FVIII was tested. No intraoperative or postoperative complications were reported. Drains were removed on the first postoperative day (blood loss: 150 cc on right knee, 200 cc on the left knee) and active motion of the ankles and isometric quadriceps contractions were explained to the patient. Two days after surgery, a Continuous Passive Mobilization (CPM) protocol was introduced with progressive intensity. The patient reached a painless ROM of 0°-50° bilaterally on the fifth postoperative day, and was able to move independently in a wheelchair. After a week, the patient was discharged, and transferred to the institutional rehabilitation ward in the same facility. Three weeks after surgery, the patient was discharged with ROM 0°- 90° at right knee, 0°-100° at the contralateral and a good gait ability with a single crutch.

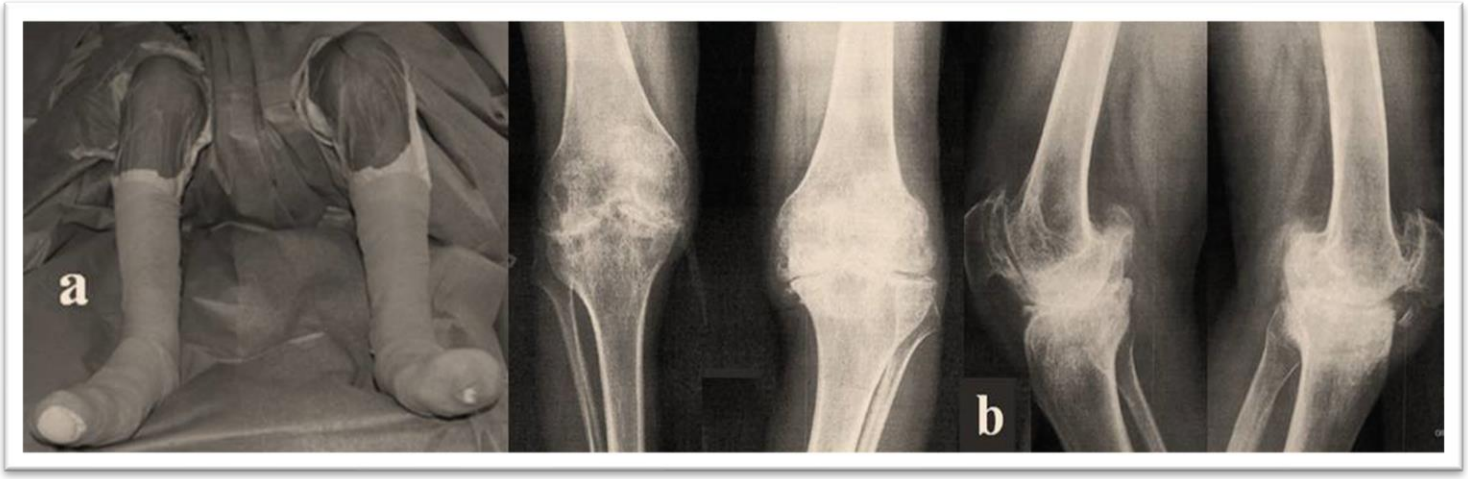

Figure 1: Preoperative clinical (a) and radiographic (b) aspect.

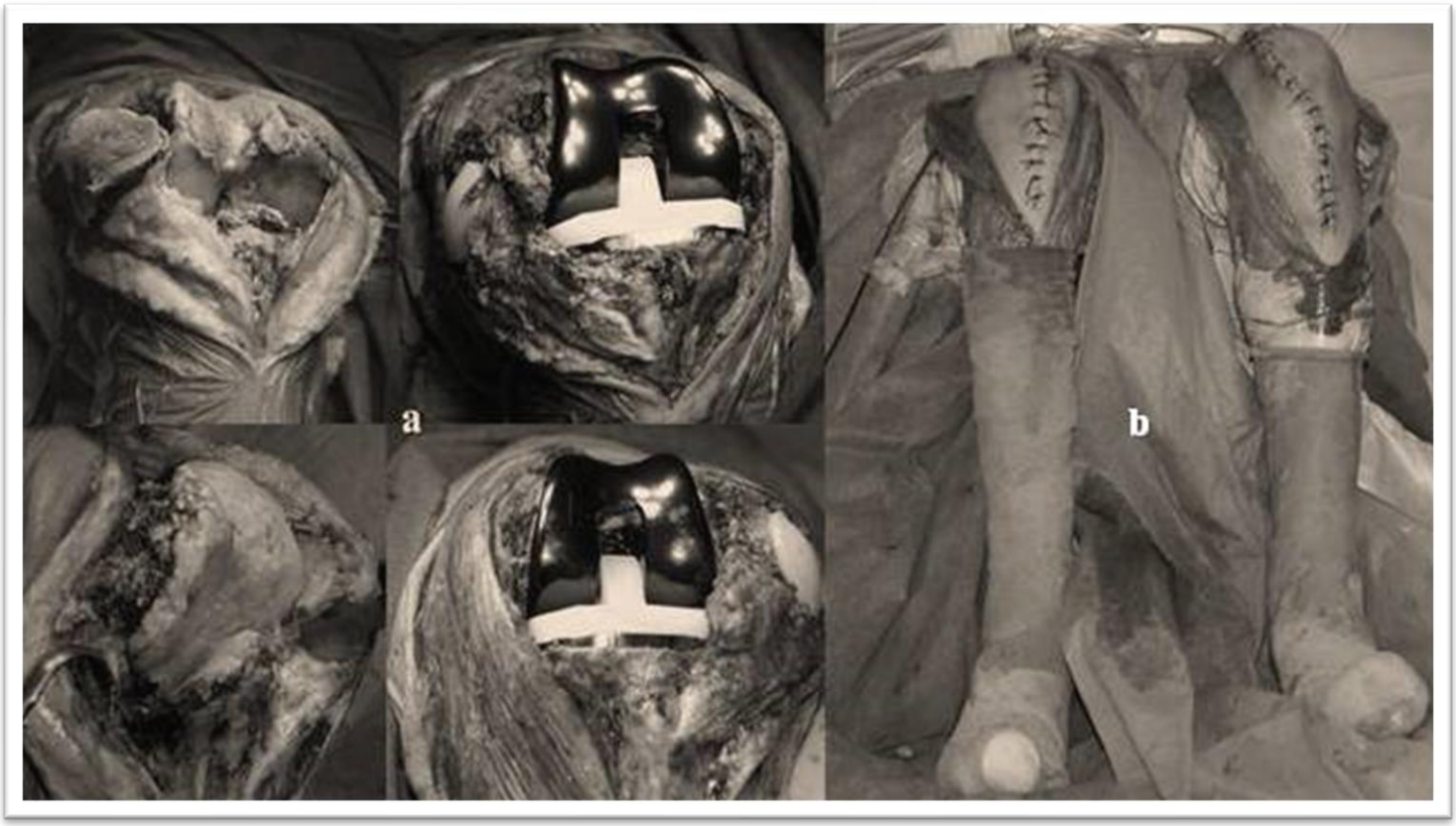

Figure 2: Intraoperative images before the osteotomies and after implant (a); end of surgery (b).

The first follow-up visit was performed one month after surgery: ROM 0°-95° at right knee, 0°-100° at the left one, no pain during daily activities, full recovery of daily activities, and return to work. The KSS reached a score of 82 for the right knee, 85 for the left knee. At the latest assessment (9.4 years after surgery), the patient is very happy, and able to move and work significantly better than before surgery (Figure 3).

Discussion:

Orthopaedic surgery in haemophiliacs is technically demanding. In case of a bilateral involvement, the patients' comorbidities or risks frequently limit the opportunity to perform a simultaneous procedure. TKA is one of the most successful procedures of modern Orthopaedics, with good long-term clinical results and survival in haemophiliacs [7,8]. Similar outcomes have been reported for simultaneous bilateral TKAs, with a substantial reduction of the risks and costs in patients affected by Osteoarthritis: very few publications deal with haemophilic arthropathy [12,13]. Reichel and colleagues reported about 6 cases treated with a one-stage bilateral TKA with variable functional outcomes, and significant rates of complications: they suggested strict indications due to high risk of complications [9]. Frauchiger and colleagues reported a case of a simultaneous bilateral TKA in a 40-year-old haemophiliac with inhibitors complicated by an aneurysm of the popliteal artery that requested further surgery [14]. Recently, Thes et al. reported a comparison between two groups of haemophiliacs undergoing simultaneous (5 patients) vs. staged (12 patients) TKA with favorable clinical result outcomes in terms of costs for the former group with respect to the latter [15].

In selected cases of motivated subjects with Haemophilia, balanced comorbidities, and with the absolute agreement of all specialists of the Haemophilia Treatment Center, a bilateral TKA procedure may be considered a valuable option. The advantages may consist of a single surgical procedure, faster recovery, reduction of costs for the haematological prophylaxis and hospitalization; the high risk of complications can be avoided only thanks to the close cooperation between Specialists

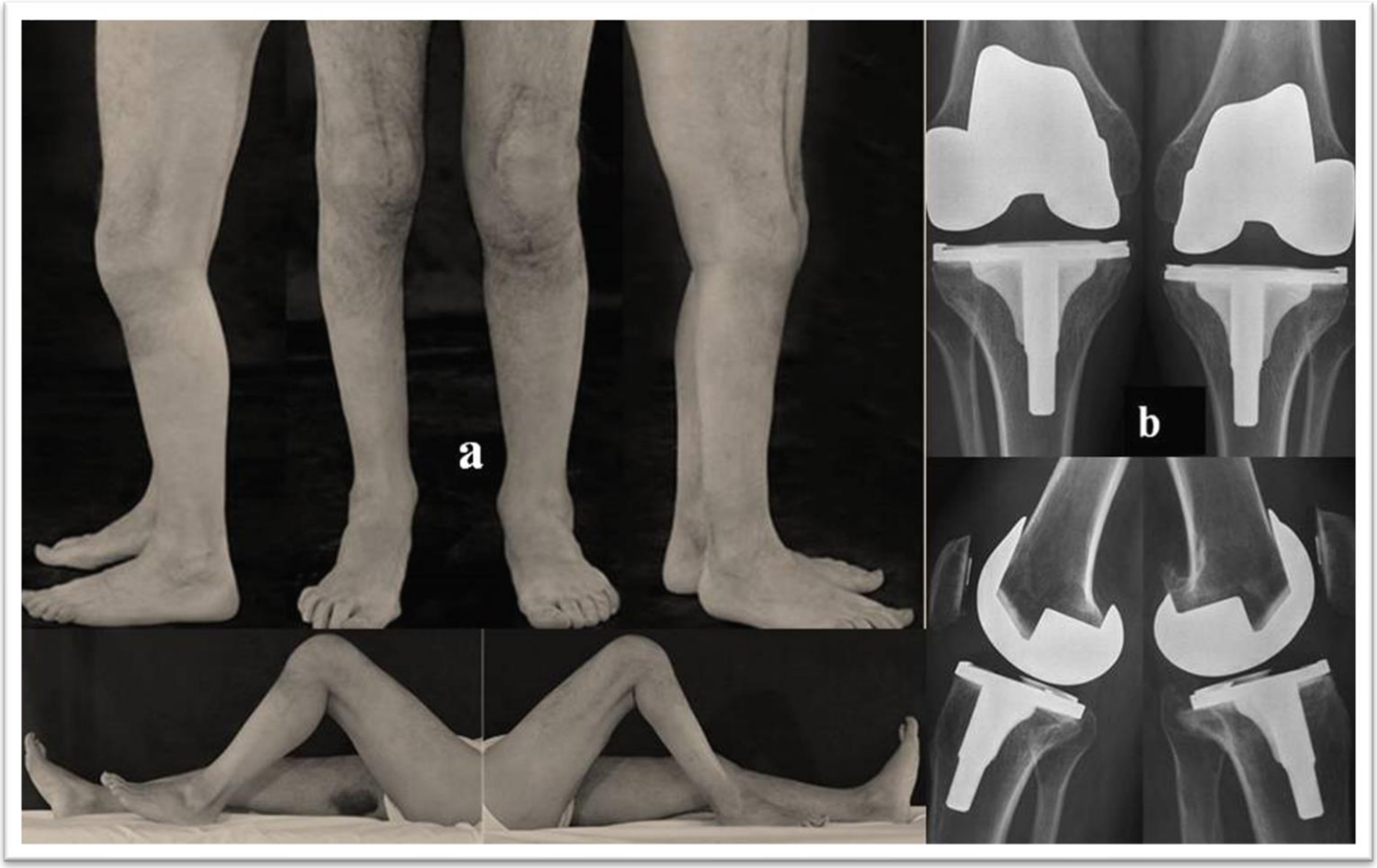

Figure 3: Last follow-up (more than 9 years after surgery): clinical (a) and radiographic (b) aspects

in dedicated Centers and full information given to patients, both keys to success in such challenging cases.

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Original Paper

Comparison of the incidence of MTHFR C677T homozygosity and hyperhomocysteinemia in patients with and without thromboembolism.

Abstract

Background: The association between methylene tetrahydrofolate reductase (MTHFR) polymorphisms, high homocysteine (HCY) and the risk of thrombosis is still ambiguous. **Aims**: The aim of our study was to analyze retrospectively the incidence of homozygosity for MTHFR, HCY levels and thrombosis. **Materials and methods**: We retrospectively analyzed the clinical data of 407 subjects followed up by our centre: 270 with homozygosis for MTHFR C677T mutations and normal or elevated HCY levels compared to 137 subjects without thrombophilia. **Results**: In both groups with MTHFR C677T homozygosity, the incidence of thrombosis was lower than in the group of subjects without MTHFR mutation and normal HCY levels, but this difference was statistically significant only when we compared subjects without thrombophilia to those with homozygosis for MTHFR C677T and normal HCY. **Conclusions**: Differently from other studies, we did not observe a correlation between thrombotic risk and MTHFR C677T homozygosity. We confirmed the importance of homocysteine in the etiopathogenesis of thrombosis, although it is probably still not clear which level of hyperhomocysteine should be considered as a real risk factor for thrombosis.

Key-words

Genetics, Homocysteine, MTHFR, Thrombophilia

Introduction

Homocysteine (HCY) is an intermediary aminoacid formed by the conversion of methionine to cysteine. Homocysteine is metabolized by one of two divergent pathways: trans-sulfuration to cystathionine, which requires vitamin B6, and re-methylation to methionine, which requires folate and vitamin B12 (1). Methylene tetrahydrofolate reductase (MTHFR) is a key enzyme that catalyzes the conversion of 5,10- methylenetetrahydrofolate to 5-methyltetrahdydrofolate, a co-substrate for the re-methylation of homocysteine to methionine (2). Previous studies have demonstrated that homozygosis for the MTHFR C677T mutation is associated with an increased risk of thrombosis, even in the absence of hyper-homocysteinemia (hHCY) (3,4), unlike other authors who observed that homozygosity for the 677T>C MTHFR polymorphism (MTHFR C677T) is linked to an increase in homocysteine level (5,6), but it is not clearly linked to an increase in thrombophilic events (7,8). Other researches showed that MTHFR polymorphisms do not increase the risk of thromboembolic disease, but only when found in a heterozygous state (9). For these reasons, the measurement of homocysteine, or MTHFR C677T genetic variant, is still a part of routine thrombosis or thrombophilia work-up in many thrombosis centres all over the world, even though the association between hyper-homocysteinaemia (hHCY) and the risk of recurrent venous thrombosis is still ambiguous (10). The aim of this study was to determine

the incidence of thrombosis in patients homozygous for C677T MTHFR mutation, with or without hHCY, compared to healthy individuals with the same characteristics and to healthy subjects without any thrombophilia.

Material and Methods:

We retrospectively analysed the clinical data of 407 subjects followed up by our centre in the last 10 years: 106 males, 301 females; average age: 40.3 (7-84). We divided them into three groups: the first consisted of 135 patients (15 m, 120 f; average age: 40.7; range 12-83) with homozygosis for MTHFR C677T mutations and normal HCY levels, the second group consisted of 135 patients (70 m, 65 f; average age: 39.4; range 15-84) with homozygosis for MTHFR C677T mutations and hHCY, and the third one was composed of 137 patients (21 m, 116 f; average age: 40.7; range 7-77) without any congenital or acquired thrombophilia. Demographic and clinical characteristics of patients and controls are shown in table 1. The incidence of thrombosis was analysed in all groups and the data obtained were analysed using chi-square test: a $p < 0.05$ was considered significant. All arterial and venous thrombotic events were included in the data collection. All subjects with other congenital or acquired thrombophilia coagulation defects (antithrombin deficiency, protein C or protein S deficiency, activated protein C resistance, factor V Leiden, prothrombin G20210A polymorphism, presence of lupus anticoagulant or phospholipid-binding antibodies) were excluded from the study. HHCY has been defined if greater than 15 mM. The significance of those differences observed between the groups was tested using chi-square analysis. Statistical significance was considered a P value less than 0.05.

Results:

We found a slightly higher thrombosis rate in homozygous subjects with hHCY, 24/135 (17.8%), compared to those with normal homocysteine, 21/135 (15.5%), even if no statistical significance emerged (p=0.24).

The incidence of thrombosis in both groups was lower than in the group of subjects without MTHFR mutation and normal HCY levels: 38/137 (27.7%); this difference was statistically significant only when we compared subjects with no thrombophilia to homozygous MHTFR C677T and normal HCY (p=0.014) but not in comparison to homozygous MHTFR C677T and hHCY (p=0.06). The comparison between the three groups with statistical significance is shown in Table 2.

Table 1: Demographic and clinical characteristics of patients and controls

	Average age (range)	Sex	Thrombosis	No Thrombosis
Homozygosis MTHFR C677T and nHCY (n=135)	40.7 (12-83)	15 M, 120 F	21 (15.5%)	114 (84.5%)
Homozygosis MTHFR C677T and hHCY (n=135)	39.4 (15-84)	70 M, 65 F	24 (17.8%)	135 (82.2%)
Subjects with no congenital or acquired thrombophilia) (n=137)	40.7 (7-77)	21 M, 116 F	38 (27.7%)	99 (72.3%)
Total (n= 407)	40.3 (7-84)	106 M, 301 F	83 (20.4%)	324 (79.6%)

C677T MTHFR: 677T>C Methylene tetrahydrofolate reductase polymorphism; nHCY: normal homocysteine; hHCY: hyperhomocysteine;

Table 2: Comparison and statistical significance of the different groups of patients

Comparison of homozygous C677T MTHFR subjects with hHCY, to those with nHCY		
	Thrombosis	No thrombosis
Homozygous C677T MTHFR and nHCY (≤15 µmol/L)	21 (15.5%)	114
Homozygous C677T MTHFR and hHCY (>15 µmol/L)	24 (17.8%)	111
	p= 0.24 (NS)	
Comparison of homozygous C677T MTHFR subjects with nHCY, to those without thrombophilia		
Homozygous C677T MTHFR and nHCY (≤15 µmol/L)	21 (15.5%)	114
No thrombophilia	38 (27.7%)	99
	P=0.014	
Comparison of homozygous C677T MTHFR subjects with hHCY, to those without thrombophilia		
Homozygous C677T MTHFR and hHCY (>15 µmol/L)	24 (17.8%)	111
No thrombophilia	38 (27.7%)	99
	P=0.06 (NS)	

C677T MTHFR: 677T>C Methylene tetrahydrofolate reductase polymorphism; nHCY: normal homocysteine; hHCY: hyperhomocysteine; NS: no statistical significance

Discussion:

Contrary to what many studies report in the scientific literature, we found a higher percentage of thrombosis in the population without homozygous MHTFR C677T and without hHCY compared to the population with homozygous MHTFR C677T, both with or without hHCY, but statistical significance was achieved only when we excluded hHCY. The increase in homocysteine was in fact decisive in the comparison only between patients homozygous for MTHFR, even if without statistical significance. This confirms the importance of homocysteine as an independent risk factor in the etiopathogenesis of thrombosis, although it is probably still not clear which level of hHCY should be considered as a real risk factor for thrombosis. The lack of direct correlation between thrombotic risk and MTHFR mutation we have noted, could be indirectly confirmed if we observe the results about the high prevalence of C677T MTHFR in the general population, as was reported by other studies that showed that the homozygous C677T MTHFR is particularly common in Mexico (32%), in Southern Italy (26%) and in Northern China (20%) (11), or that the homozygous C677T MTHFR ranges from less than 1% among African Americans to 20% plus among some Caucasian populations and Hispanics, while Asian populations have a prevalence of around 11% (12). In our

opinion, prospective multicentre studies comparing thrombotic patients to healthy subjects are necessary to confirm definitively the absence of independent thrombotic risk from the MTHFR mutation in both heterozygosity and homozygosity, and to define better the exact degree of danger of the hHCY in the aetiopathogenesis of thrombosis

Conflict of interest statement: The authors declare that they have not received any funding and they have no conflicts of interest related to the publication of the paper.

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Cases Series

Simultaneous bilateral total knee prosthesis in patients with severe hemophilia with high response inhibitors.

Abstract

Two cases of simultaneous bilateral total knee arthroplasty are reported in two patients with severe hemophilic arthropathy with high response inhibitors. In the world literature there is only one case report, the first patient aged 38 years and the second aged 42 years, with severe joint destruction of both knees, both underwent a simultaneous bilateral total knee arthroplasty, where two teams with the same experience start with one knee and the next team goes one or two steps back, that optimizes the use of factor VIII, which in a country with an emerging economy, makes performing a surgical procedure in a patient with hemophilia very difficult, and especially in one with inhibitors. Recovery and rehabilitation was global, patient satisfaction was quite favorable and there was an improvement in their quality of life.

Key-words

Knee prosthesis, Hemophilia, Inhibitors, Hemophilic Arthropathy.

Introduction

Hemophilia A and B are congenital disorders linked to the X chromosome, which are caused by the absence or decrease of clotting factor in the plasma, in hemophilia A, factor VIII deficiency and factor IX in hemophilia type B. These coagulation disorders cause recurrent bleeding that commonly occurs in the musculoskeletal system in more than 90% of cases, its most common manifestation being joint bleeding, the final consequence of which is the development of hemophilic arthropathy [1], characterized by synovial hypertrophy. With the destruction of the joint surface, bone damage occurs with joint stiffness, pain and permanent severe functional disability; the knee (target organ) being the most affected joint in 44 to 50%, followed by the elbow 25%, ankle 15%, shoulder 8%, hip 5% approximately; This is a disabling disease that decreases the quality of life of the hemophilia patient. The use of the deficit factors VIII or IX concentrates means that orthopedic surgery can be performed safely and with a high expectation of success [2]. However, up to 30% of patients with hemophilia can develop inhibitors, this being the most common and serious complication of replacement therapy in patients with hemophilia A or B. Therefore, the use of recombinant factors concentrates or bypass agents is required. Thus, in the last 40 years, these patients have benefited from elective orthopedic surgery, thanks to multidisciplinary treatment and the administration of the deficient factor, recombinant or bypass agents in patients with and without inhibitors, making the surgery safe and successful. Often more than one joint is affected, so multiple surgical

procedures are indicated in the hemophilia patient. Since prosthetic knee replacement is one of the most commonly indicated major surgeries [3], the advantage of performing a simultaneous bilateral total arthroplasty is that it allows the use of the deficient coagulation factor to be optimized, thus reducing hospital costs, and a global recovery of the functionality. Eventually, this facilitates pain control, shortens the rehabilitation period and everything is performed in only one surgical event, and with a single anesthetic event of maximum 2 hours. And also, it reduces surgical stress with 2 surgical teams working simultaneously if compared to a bilateral arthroplasty in stages or a bilateral total arthroplasty performed one after the other. In Mexico there are currently more than 5,800 patients with hemophilia, and more than 50% of these are treated at the IMSS, and it is estimated that around 70% of these patients already have joint damage, and an alarming 75% do not receive adequate treatment or even no treatment at all.

Case Series

We report two cases of severe hemophilia A with high response inhibitors, both patients with Hepatitis C and referred to the UMAE service of Femur and Knee of the Traumatology Hospital "Victorio de la Fuente Narváez" to be assessed. The first patient had been suffering with disabling pain for more than two years, with limited mobility of both knees and difficulty in walking; irreversible joint damage was observed in his X-rays. Both knees were assessed as stage V on the Arnold-Hilgartner radiological scale (Figure 1). Patient two referred from the hemophilia clinic of the XXI Century Medical Center, had presented joint pain and functional limitation of both knees for more than 5 years, and x-rays revealed severe joint injury, at an estimated radiographic stage V of Arnold-Hilgartner. Both patients underwent general anesthesia without complications, during the surgical event one hour before the skin incision, a dose of rFVIIa of 120 µg/kg (Novoseven) was given [4,5,6], then the treatment was continued every two

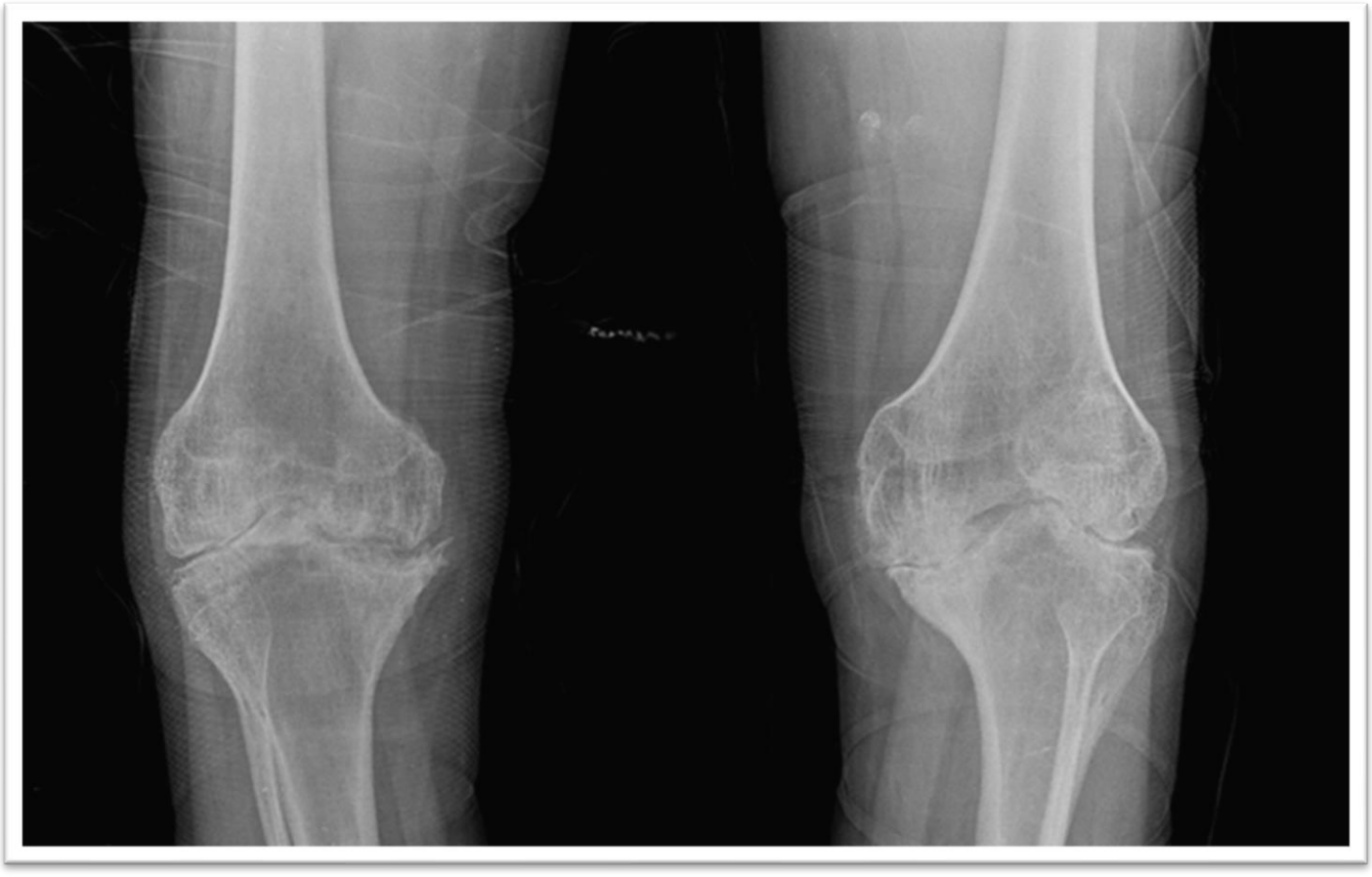

Figure 1: Patient 1 knees with Arnold-Hilgartner radiological scale stage V

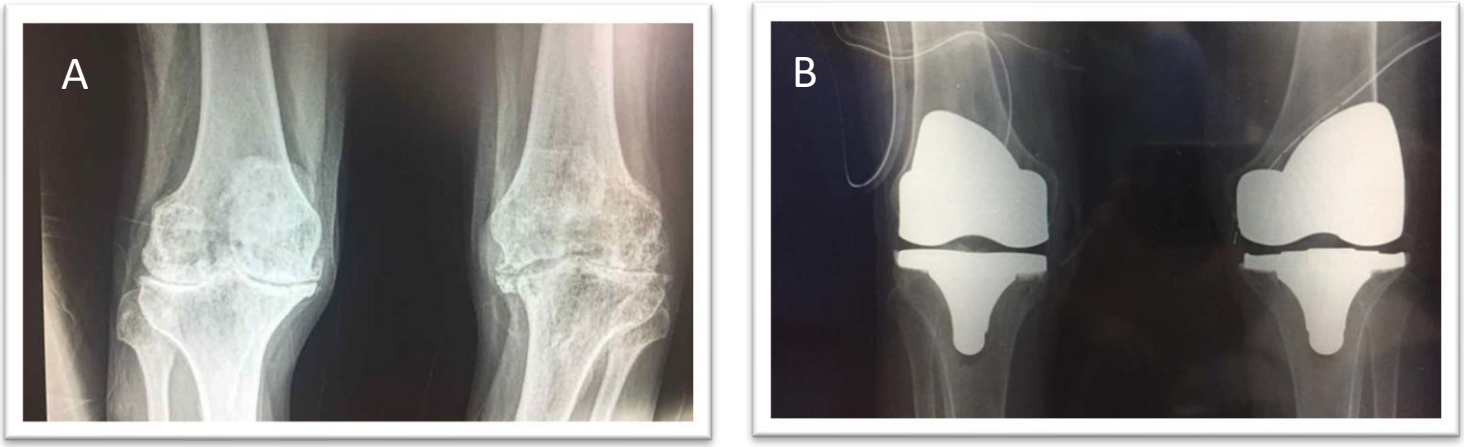

Figure 2: Patient 2 before (A) and after implant (B)

hours the first day with a dose of 90 µg/kg for 48 hrs, and subsequently a scheme of 90 µg/kg was continued every 4 hours, and then the same dose every 6 hrs for three more days. During the closure of the surgical wound, 2.5 g of Tranexamic acid was inserted intra-articularly in each knee and negative pressure drains were placed in each knee, which were opened two hours later. Simultaneous bilateral arthroplasty was performed in both patients with the aforementioned technique; the only complication, was a partial injury of the collateral ligament of the right knee, reported in patients 1 and 2, due to the deformity, resulted in patient 1 with a delay in the healing of the right knee but which resolved without other complications. Currently the patient with 1 to 5 months of evolution presents a mobilization of the right knee of 10° of extension to 70° of flexion, left knee with 15° extension and flexion up to 90°, both without pain and without instability, shown by postsurgical X-rays.

Patient two presented as a complication a partial lesion of the lateral collateral ligament which was repaired during the surgery, a triplanar splint was placed and after 4 months of evolution the right knee was observed with flexion of 10° and extension of 90° and the knee left with extension of 20° plus flexion of 70°, as shown by X-rays (Figures 8, 9 and 10). Significant improvement according to the Hemophilia joint score (HJHS), with a presurgical average of 93 and a postoperative follow-up decreasing the index to 55, which increased functionality, reduced pain and improved quality of life. Reduction in hospital costs and deficit factor concentrates for a single event, surgical time, hospital stay of 5-10 days, rapid ambulation, timely rehabilitation, and the psychological impact was favorable for the patient.

Conclusion:

Arthroplasty can relieve pain and improve the function of symptomatic hemophilic patients with advanced arthropathy, thus improving their quality of life, the knee and hip damage being the most common hemophilia complication and giving the best results [7,8]. With the advent of rVIIa recombinant concentrates and bypass agents, orthopedic and non-orthopedic surgery in patients with hemophilia and inhibitors can be performed with high expectations of success and safety [9].

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