

Arthroscopic Treatment of Gonarthrosis in a Low-Income Setting

Kevin Parfait Bienvenu Bouhelo-Pam^{1,2*}, Affleck Romaric Ledier Angalla^{2,3},
Norbert Edgard Lamini N'soundhat^{2,3}, Marius Monka^{1,2},
Arnauld Sledje Wilfrid Bilongo Bouyou^{1,2}, Paul Yèlai Ikounga^{1,2}, Térance Olivier Etsaka-Ohoya¹

¹Department of Orthopaedic Surgery and Traumatology, University Hospital of Brazzaville, Brazzaville, Congo

²Faculty of Health Sciences, Marien N'GOUABI University, Brazzaville, Congo

³Department of Rheumatology, University Hospital of Brazzaville, Brazzaville, Congo

Email: *bopakev@yahoo.fr

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Abstract

Background: Knee osteoarthritis is a frequent, debilitating, and degenerative condition. It is the most common operative indication for surgical arthroscopy. **Hypothesis:** Arthroscopy allows painless treatment of knee osteoarthritis and functional recovery. **Patients and Methods:** Our study was conducted in a private medical center in the city of Brazzaville in Congo, during the period from September 2020 to February 2023. It was prospective and based on patients with mechanical knee pain caused by osteoarthritis. A mobile arthroscopy device was used. The IKDC and KOOS scores allowed the evaluation of the treatment. **Results:** Our work involved 15 men and 7 women, with an average age of 39.9 years. Knee osteoarthritis was classified as type 2 according to Ahlbäck in 26 cases (70.27%) and type 3 in 11 cases (29.73%). In 7 patients, arthroscopy revealed lesions not visualized on MRI. Joint lavage was performed in all cases, synovial debridement in 17 cases (45.94%), and extraction of cartilaginous foreign bodies in 10 cases (27.03%). 20 patients were very satisfied with the surgery and 2 moderately satisfied. The EVA, subjective IKDC and KOOS scores were acceptable on a long-term follow-up. **Discussion:** Arthroscopy is a modern surgical technique for the management of intra-articular lesions of the knee. It relieves pain and stabilizes the degenerative process. A mobile arthroscopy device used here was preferred because of the low cost of installation and production.

Keywords

Arthroscopy, Surgery, Imaging, Knee

1. Introduction

Knee osteoarthritis is a common degenerative pathology of the knee joint. It is often bilateral and diagnosed on X-rays. However, the onset of the disease begins before the appearance of radiological signs [1]. Surgical arthroscopy is a percutaneous, minimally invasive technique whose goal is the exploration of the knee cavity but also the application of treatment procedures allowing pain release and functional recovery [2]. Degenerative pathology is the most common surgical indication for surgical arthroscopy, in middle-aged and elderly subjects [2], when well-conducted drug treatments are ineffective. There is very little data in Africa on Arthroscopic Surgery, especially in the management of knee osteoarthritis [3]. Our study is the first for this type of treatment in Congo. The technique is innovative [4] and has a low potential for complications [5]. Widely practiced in developed countries, there is however little data on this treatment in sub-Saharan African subjects. Our study aimed to describe the therapeutic application of surgical arthroscopy in the treatment of knee osteoarthritis in a low-income setting.

2. Materials and Methods

Our study involved patients with chronic mechanical knee pain associated with osteoarthritis. The study setting was Verano medical clinic in the city of Brazzaville in Congo. The study was longitudinal with prospective data collection. 22 patients were collected during the period from September 2020 to February 2023, among which surgical arthroscopy was performed for 37 knees. Patient recruitment was non-probabilistic. Patients present and meeting the inclusion criteria were routinely enrolled. We included patients over 18 years of age with chronic knee pain and degenerative radiological signs. The study variables were epidemiological, clinical, therapeutic, and evolutionary. Comparative radiography of the knee made it possible to objectify the osteoarthritis lesions and to classify the lesions according to Ahlbäck [6]. Magnetic resonance imaging (MRI) was requested to confirm the lesion but also to prepare for surgery. A portable arthroscopy column (**Figure 1**) was used for all patients. This device allowed the recording of the surgical procedure on a USB key. Micro-fractures using the Mithoefer technique have been performed in some patients [7]. The clinical results were evaluated by the visual analogue scale, the subjective IKDC score (International Knee Documentation Committee) [8] and the KOOS score (Knee injury and Osteoarthritis Outcome Score) which assess pain, symptoms, daily life activities, sport/leisure, knee-related quality of life [9]. All the operated patients were followed for 18 months. Data analysis was performed with SPSS version 22.0 software. The t-student test was used for the comparison of quantitative variables. The frequency distribution between the groups was examined with Fisher's exact test. The significance level was $p < 0.05$.

3. Results

15 patients were males and 7 females. The average age was 39.9 years (**Table 1**).



Figure 1. Portable arthroscopy column.

Table 1. Patient demographics.

Characteristics	Results
Age (year)	39.9 ± 1.61
Gender (men/women)	15/7
Body mas index (Kg/m ²)	27.2 ± 3.2
Affected knee: droit/gauche	21/16
Average follow-up (mois)/extremes	18/7 - 26

The reason for consultation was knee pain in all patients. The functional impact was significant in our series with a reduction of the walking perimeter to 200 meters in 14 patients (63.63%). The limitation of bending joint amplitudes was present in 11 patients with a median range of motion of 97.5 degrees (extremes 40 to 140 degrees). Early post-traumatic or post-infectious osteoarthritis was identified in 14 cases, and primary senile origin in 8 cases. Our patients were classified as type 2 according to Ahlbäck in 26 cases (70.27%) and type 3 in 11 cases (29.73%). Joint effusion was found clinically or on MRI in 17 patients. Degenerative chondropathy was confirmed on arthroscopic exploration in all patients (**Figure 1**). It was tri-compartmental in 27 cases (72.97%) and bi-compartmental in 10 cases (27.03%). Arthroscopy revealed a lesion not visualized on MRI in 7 patients. In our patients, there was a correlation between degenerative meniscal lesions and cartilage lesions ($p = 0.00001$). Many degenerative meniscal lesions were radial fissures in 15 patients (68.18%) (**Figure 2**). Cartilaginous foreign bodies with blockage were noted in 11 patients (50%) (**Figure 3**). There was no cruciate ligament rupture in our study but degenerative ligament damage. Joint lavage was performed in all cases, synovial debridement in 17 cases (45.94%),

extraction of cartilaginous foreign bodies in 10 cases, (27.03%) (**Figure 4**), partial meniscectomy in 2 cases, and infra-patellar plica resection in 2 cases. A conversion from surgical arthroscopy to open arthrotomy was necessary in a patient for the extraction of large chondromas. The technique of micro-fractures was practiced in 20 cases (54.05%). Visco-supplementation by injection of hyaluronic acid was performed in 5 patients. 20 patients were very satisfied with the surgery and 2 moderately satisfied. The VAS and subjective IKDC scores favored the longer follow-up (**Table 2**). The same was true for the KOOS score subsets, which were significantly increased at the last follow-up ($p < 0.01$) (**Table 2**). Arthroscopic treatment in our series resulted in significant improvement in pain, symptoms, and common activities at 6 months and at the last follow-up (**Table 2**). The resumption of daily activities and walking was possible in all our patients. The resumption of sport was possible for 10 patients. Two complications were noted: one case of material brie and one case of complex regional pain syndrome. Healing of the surgical wounds was achieved in all cases, leaving no aesthetic squeal in our patients.

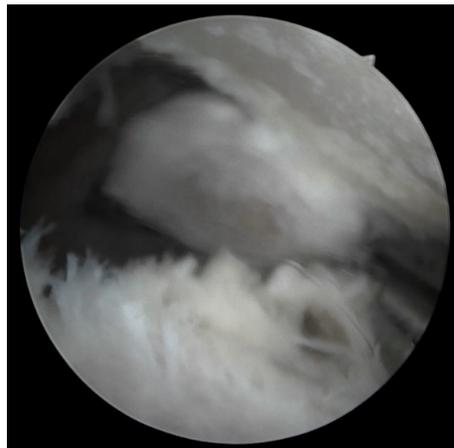


Figure 2. Macroscopic appearance of osteoarthritic chondropathy found in a 58-year-old patient.

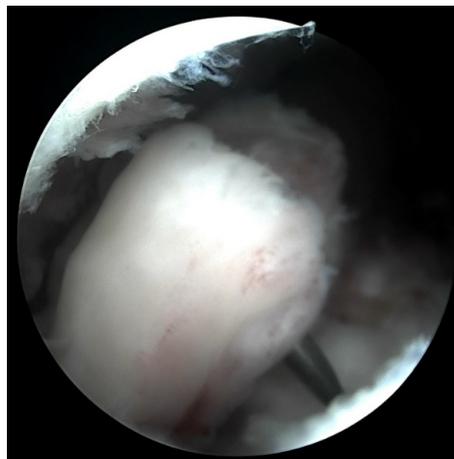


Figure 3. Cartilaginous foreign body visualized by arthroscopy.



Figure 4. Cartilaginous foreign bodies after extraction.

Table 2. Comparison of scores according to intervals.

	Scores			p	
	Pre surgery	6 months	Last follow up	Pre surgery/6months	Pre surgery/last follow up
EVA	6.1	3.1	0.2	0.01	0.01
Subjective IKDC	37.4	82.2	89.4	0.01	0.01
KOOS					
Pain	48.3	93.3	95.6	0.03	0.01
Symptoms	50.5	87	85.7	0.01	0.01
Daily life activities	64.4	89.6	94.7	0.01	0.01
Sport/leisure	31.2	37.5	43.4	0.01	0.01
Qu Knee-related quality of life	28.5	86.6	88.2	0.01	0.01

4. Discussion

Knee osteoarthritis is a degenerative pathology that is often poorly tolerated. It is estimated that 25% of patients experience pain during knee osteoarthritis [10]. This generally justifies the practice of several drug treatments in self-medication or after several consultations. Our study was limited by sample size and short run time a mobile arthroscopy device used here was preferred because of the low cost of the installation requiring reduced infrastructure. Performing the surgical procedure was also made easy by the light and ergonomic equipment. Our portable arthroscopy column has allowed a complete exploration of the joint cavities in all our patients, with the advantage of a minimum of installation, speed of action, and lower costs. The autonomy of the battery made it possible to overcome the problems of the supply of electricity. This is a huge advantage for developing countries. It was possible to record the surgical procedure on a USB key, allow-

ing the data to be stored without the need to add an additional recording device. Our study was single-center due to aseptic and specialized staff requirements, but mobile arthroscopic equipment has the advantage of being easily transportable to an operating room in another health center. This would make it easier to bring care closer to a locality, particularly in the context of a health campaign. Equipment maintenance issues were limited and simplified. The presence of a biomedical maintenance specialist was not necessary as in the case of the maintenance of a conventional arthroscopy column. This device maintenance often requires the presence of a foreign expert. The installation and monitoring of the machine were done each time by a nursing staff in our case. Arthroscopy is a modern surgical technique for the management of intra-articular lesions of the knee. The three main causes explaining pain in gonarthrosis are synovitis, meniscal lesions, and subchondral lesions. Surgical arthroscopy allows a detailed examination of cartilage lesions, a macroscopic analysis of the subchondral bone, the synovium, and the menisci [11]. Our study confirmed its necessity in the diagnosis of certain lesions not visualized on imaging, but also in the management. The postoperative course was generally good in our experience. Pan *et al.* [12] have clearly demonstrated the advantages of arthroscopic treatment compared to open arthrotomy, particularly in terms of postoperative outcome. Surgical arthroscopy is less hemorrhagic, has less risk of infection, less anesthetic risk, and fewer functional sequelae. Three cartilage treatment modalities have been proposed in the literature [13]: chondro-protection, chondro-repair, and chondro-generation. The quality of the regenerated tissue is different depending on the techniques. Osteoarthritis being irreversible, chondro-protection and chondro-repair are the most recommended. Arthroscopy's main goal is to relieve pain and stabilize the degenerative process. The micro-fracture was practiced in our series because of the ease of its execution and the fact that it does not require large equipment for its realization. The benefits are described and demonstrated by some authors [14] [15]. They are comparable to cultured chondrocyte grafting except in the long term when there is a greater longevity of the new cartilage after chondrocyte grafting [16]. Synovectomy in our series, as recommended by Charrois *et al.* [17], allowed targeted and complete resection of the pathological synovial areas, thus reducing their volume. Platelet-rich plasma, not used here, is increasingly recommended in recent studies on the treatment of knee osteoarthritis with considerable positive effects on pain and function [18]. Our results reflect the effectiveness of surgical arthroscopy in osteoarthritic conditions and thus confirm the indications, whenever medical treatment is ineffective. The resumption of activities reflects the safety of the surgical technique. The low practice of sports observed in our series could be explained by the cultural habits.

5. Conclusion

Surgical arthroscopy of the knee is of great interest in the management of gonarthrosis. In addition to cartilaginous evaluation, it allows pain relief with pa-

tient satisfaction, stabilization of the degenerative process, and protection of the cartilage. Our study showed the benefits of performing a specific surgery with maximum therapeutic outcomes for minimum conditions and infrastructure. This is easily replicated in low-income countries. In tough conditions, treatments that are often poorly executed lead to advanced stages of osteoarthritis. In our study, however, the lack of resources did not impact the results.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

Obtained.

Informed Consent

Obtained.

Authors' Contribution

Patient recruitment, examination, writing.

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