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НЕОБЪЯСНИМАЯ БОЛЬ ПОСЛЕ ТОТАЛЬНОГО ЭНДОПРОТЕЗИРОВАНИЯ КОЛЕННОГО СУСТАВА

С. Парратте[1], Н.Н. Корнилов[2], Э. Тиенпонт[3], А. Балдини[4], Р.М. Тихилов[2], Ж.-Н. Аргенсон[1], Т.А. Куляба[2]

[1]Больница Св. Маргариты, отделение ортопедической хирургии, Марсель. Франция
[2]Российский научно-исследовательский институт травматологии и ортопедии им. Р.Р. Вредена, Санкт-Петербург, Россия
[3]Университетская клиника Св. Луки, Брюссель, Бельгия
[4]Клиника IFCA, Флоренция – IRCCS Клинический институт Humanitas-Rozzano, Милан, Италия

Несмотря на то, что тотальная артропластика коленного сустава приводит к улучшению функции и уменьшению болевого синдрома у подавляющего большинства пациентов, ряд больных после операции продолжают испытывать болевые ощущения. Причины боли и нарушения функции после эндопротезирования могут быть обусловлены как внутрисуставными, так внесуставными факторами. Системный подход к обследованию таких пациентов чаще всего позволяет установить источник боли и провести соответствующее лечение. Тем не менее, существует небольшая группа пациентов с необъяснимой болью, лечение которых является крайне сложной клинической задачей.

Нами выдвинута гипотеза, что без четкого понимания причины неудачи первичного вмешательства проведение ревизионного эндопротезирования таким пациентам не показано. В данном обзоре литературы проведён анализ результатов реэндопротезированя коленного сустава, выполненных пациентам с необъяснимой болью и описаны возможные варианты консервативных подходов к лечению этой категории больных.

Ключевые слова: тотальное эндопротезирование коленного сустава, боль, ревизионная артропластика, консервативное лечение.

UNEXPLAINED PAIN AFTER TOTAL KNEE ARTHROPLASTY

S. Parratte[1] , N.N. Kornilov[2], E. Thienpont[3], A. Baldini[4], R.M. Tikhilov[2], J.-N. Argenson[1], T.A. Kulyaba[2]

[1]Department of Orthopaedic Surgery, Sainte Marguerite Hospital, Marseille, France
[2]Vreden Russian Research Institute of Traumatology and Orthopaedics, St. Petersburg, Russia
[3]University Hospital Saint Luc, Brussels, Belgium
[4]IFCA Clinic, Florence – IRCCS Instituto Clinico Humanitas-Rozzano, Milan, Italy

Although total knee arthroplasty (TKA) improves function and reduces pain for the large majority of the patients, a few continue to have pain and require investigation. The causes of dysfunction and pain after total knee arthroplasty can be described as intrinsic (intra-articular) or extrinsic (extra-articular) sources of pain. For the majority of the cases, following a complete evaluation protocol, the cause of pain can be identified and a specific treatment can be applied, however occasionally there remains a group of patients with unexplained pain whose management is difficult. It was our hypothesis that revising a TKA without pre-operative diagnosis of the failure is not worth. Therefore, the aimed of this review was to: 1) analyse the results of revision TKA for unexplained pain, and 2) described the potential solutions for an alternative conservative management of the painful TKA.

Key words: total knee arthroplasty, pain, revision, non-operative management.

Introduction

Although total knee arthroplasty (TKA) improves function and reduces pain for the large majority of the patients, a few continue to have pain and require investigation [8, 9, 14]. The causes of dysfunction and pain after total knee arthroplasty can be described as intrinsic (intra-articular) or extrinsic (extra-articular) sources of pain [14] . The extrinsic causes are those outside the knee including the hip or the spine problems. Intrinsic causes are within the knee itself such as infection, aseptic loosening, soft tissues impigment, neuroma around the knee, or causes directly related to surgical technique issues [8, 9, 14]. Finally patient specific causes involve abnormal inflammatory responses and patient motivation issues that are sometimes less specific [4, 5, 8, 9, 10, 14] . It's appropriate to have the right set of tools when evaluating these patients [18]. After a very accurate clinical exam and history analysis it's useful ahead of time for every stiff and painful knee to obtain a full-length hip-knee-ankle X-ray, fluoroscopically

positioned X-rays of the TKA itself, stress x-rays, computer tomography of the knee, a complete set of laboratory tests including inflammatory testing and sometimes a bone-scan [18]. Furthermore, getting a microbiological analysis for all the painful knees seems reasonable. For the majority of the cases, following this evaluation protocol, the cause of pain can be identified and a specific treatment can be applied. After these investigations, however occasionally there remains a group of patients with unexplained pain whose management is difficult [13, 19]. It was our hypothesis that revising a TKA without the pre-operative diagnosis of the failure is not worth. Therefore, the aimed of this review was to: 1) analyse the results of revision TKA for unexplained pain, and 2) described the potential solutions for an alternative conservative management of the painful TKA.

Results of revision for unexplained pain

Pain after TKA is unfortunately not uncommon and a review based on the England and Wales National Joint Registry reported that at more than one year after TKR, 18.2% of patients were not satisfied with the outcome, usually because of pain [2]. In the literature, patients are often divided relatively to their flexion and results of revision for unexplained pain analyzed first for the subset of patients with isolated unexplained pain and second for the subset of patients with unexplained pain and a stiff knee [3, 11, 15, 21].

Results of revision for isolated unexplained pain. In the literature, the original paper reporting results of revision for unexplained pain, entitled "exploration of radiographically normal total knee arthroplasty for unexplained pain", reported the results of 27 knees which had exploratory revision for unexplained pain [19]. These patients were divided into a group with an associated range of movement (ROM) of less than 80° and those with isolated unexplained pain. For the group with a poor ROM, 60% had an excellent or good result from revision surgery and their movement increased [19]. By comparison, only 17% of the group with a good ROM benefited from revision surgery[19]. The authors concluded that revision surgery in these patients should be subject to guarded consideration, especially in knees which move freely[19]. Jacobs et al. explored the outcome of revision arthroplasty in 28 patients and found that 83% of those with a well-defined mode of failure achieved excellent or good results from revision [13]. By contrast, the five patients who were revised for unexplained pain did not achieve significant improvement [13]. It's also important to note that conversion from a uncemented to a cemented TKA lead to 86% of poor results and is therefore not recommended [13, 14, 19].

The place of the arthoscopic evaluation of the painful knee remains questionable [7, 16]. Some authors consider arthroscopy to be valuable in the evaluation of painful knee replacements while others report it to be less useful [7, 16]. Arthroscopy has been described for the treatment of adhesions, patellar malalignment, and intraarticular foreign bodies [7, 16]. In addition, fractures of polyethylene, bucket-handle tears of meniscal remnants and dysfunctional popliteus tendons have been diagnosed and treated by arthroscopy [7, 16]. The disadvantage of using arthroscopy in this setting is mainly its technical difficulty, and there are reported cases of infection being introduced under these circumstances [7, 16].

The results of revision operations in these patients are at best unpredictable and should therefore be viewed with caution [13, 19]. Patients who undergo revision arthroplasty for unexplained pain must be advised that their outcome may not be improved, and this point may positively limit the patient related pressure who may sometime think that everything will be solved following a revision.

Results of revision for pain and stiffness. Stiffness after total knee arthroplasty (TKA) is uncommon but not rare and estimates of the prevalence of stiffness vary according to the definition but range from 1 to 12 % [22, 25, 27]. Several definitions of stiff TKA have been previously used but one could be a TKA having a flexion contracture of 15º and/or less than 75º of flexion [22, 25, 27]. Although predictive risk factors have been defined such as pre-operative patellar height or limited pre-operative knee flexion, stiffness after TKA is multifactorial [22, 25]. This complication after TKA is a frustrating problem for patients and surgeon alike [22, 25]. For patients a stiff TKA is a disabling problem because it limits function during the basic activities of the daily living especially when stiffness is associated with pain [22, 25, 27]. Few patients with limitations of their range of motion end up satisfied with the results of their TKA [2, 3]. For surgeons a stiff TKA is a frustrating problem because the precise cause of stiffness remains poorly understood in the vast majority of the cases [22]. Surgical technique factors have been widely described as cause of stiffness after TKA and classically include: unknown infection, overstuffing of the patella, component malposition or malrotation, flexion/ extension gap mismatch, joint line elevation, component sizing errors, thigh posterior cruciate ligament in posterior-conservative designs [14, 17, 22, 25, 27]. These technical errors especially when important probably contribute to stiffness in a

subset of patients and their identification is an important step of the management [14]. For these cases closed manipulations, arthroscopic or open arthrolysis, isolated tibial insert exchanges, complete revision have been proposed to improved the range of motion of the stiff TKA, however the reported results of the revision surgery for these cases of stiffness were modest [1, 7, 14, 22, 25, 27]. Mean overall improvement of the arc of motion in the reported series was 35.4 degrees and most knees still cannot flex over 90 degrees [1-3, 7-9, 11, 13, 15-19]. Patients and surgeons alike should be aware first of the limited improvements in pain, range of motion and function following revision procedures and second of the substantial set of complication following these procedures [1, 7, 14, 22, 25, 27]. Patient's pressure over the surgeon's shoulders to do something to improve their pain and their function should not be a reason for revision by itself. A particular caution in patient selection and in definition of the goal and expectation of the revision surgery remains mandatory [1, 7, 14, 22, 25, 27].

Results of revision for pain related to unresurfaced patella. In general, orthopaedic surgeons performing total knee replacements can be categorized into three groups as to how they address the patella: nonresurfacers, universal resurfacers, and selective resurfacers [12, 14]. Resurfacing is associated with good clinical results but is also associated with a small risk of patellar fracture or need for patellar revision in the future [12, 14]. Nonresurfacing of the patella may prevent such problems but is associated with a higher rate of anterior knee pain and reoperation [12, 14]. The decision to resurface the patella is subjective. The current literature on patellar resurfacing after TKA, including four recent meta-analyses, has failed to show clear superiority of patellar resurfacing or not resurfacing as judged by standard clinical outcome scores [12, 14]. However, the authors concluded that patellar resurfacing could be considered a superior strategy with regard to less frequent anterior knee pain and need for reoperation [12, 14]. An unsolved problem for both resurfacing and nonresurfacing surgeons is how persistent anterior knee pain after surgery should be addressed. There are conflicting data concerning the efficacy of secondary resurfacing for anterior knee pain following unresurfaced TKA [12]. The results of a recent decision-making model based on a meta-analysis of randomized controlled trials showed that primary resurfacing of the patella is a superior strategy to nonresurfacing, and that secondary resurfacing for AKP is not recommended [12]. Reoperating may be warranted only in the case of a failed patellar implant or where a mechanical cause for pain can be identified.

Conservative management of the patient with unexplained pain

The management of painful TKR requires a multidisciplinary approach involving first the patient, surgeons, physiotherapists, psychologist, medical doctors and pain management teams, particularly if there is an element of neuropathic pain [14]. The patient's general practitioner should also be involved. The results of a prospective study of 116 patients found that 13.1% had unexplained pain one year after surgery [3]. After conservative treatment, nearly all of these patients were satisfied at the follow-up at five years. Elson and Brenkel in a series of 622 TKRs, found that 4% of patients had unexplained pain of whom 55.5% went on to show an improvement without intervention following a conservative treatment [8]. Following the results of the literature, when considering a painful TKA without any individualized cause "wait is an emergency" [3, 8, 14, 20]. Of course this should be an "active waiting period" and during this period the patient should be manage to treat all the non-surgical potential factors which may be the cause of the pain [21, 23, 26, 28]. Patient comorbidities such as overweight, diabetics, addiction including tobacco and alcohol and osteoporosis should be treated first [21, 28]. A specialist of each of these medical conditions should be consulted. In fact, if the second look specific orthopaedic evaluation for a painful TKA including the physical exam, full-length x-rays and stress x-rays, bone-scan and inflammatory markers of the knee do not individualize a clear cause to explain this pain, a multimodal conservative approach should be considered [14, 19, 24].

The first point is to try to calm down the pain of the patient [8]. The use of appropriate analgesics can help to alleviate pain and also reduce the urgency for any intervention as well as decreasing the desperation often felt by patients [8]. Many patients report low pain scores in the first three months after TKR, but in some the pain fails to improve and actually increases as time passes [8]. This often correlates with the cessation of regular analgesia by the patient who may feel that it is not required for such a long period after their operation. At this time, analgesic of level I and II of the World Health Organisation (WHO) analgesic ladder can be used regularly to calm down the patient pain [8]. No-steroid anti-inflammatory drugs can also be used [8]. Due to the side-effects of the opiate analgesia, these drugs should not be prescribed in first line, however some cases of reluctant pain may require their instauration [8].

The second step of this management is to evaluate the osteoporotic status of the patients [6]. In fact, the constraint of the newly implanted prosthesis may play the effect of the "pin in the

butter" with a very rigid body represented by the implant on the to soft bone specially in elderly women. Hypovitaminose D has been identified as frequent in the patient managed in orthopaedic surgery and the bone fragility may play a role in the painful TKA [6]. A complete vitamin-calcic evaluation associated with an osteodensitometry and spine X-rays should be prescribed and examined by a medical doctor trained in osteoporotic problems [6].

The third step is the evaluation of the spine and the general balance of the patient including a muscular evaluation of the lower limb muscular chain, as well as a correct evaluation of the foot position in static but also in dynamic conditions [23]. This exam should be systematic to detect any muscular weakness or any pathologic gait pattern [23]. Feet and ankle abnormal conditions or position should be searched and treated if needed. This step should be managed ideally by the physycal medecine and rehabilitation practicioners as this step required a global evaluation of a desabilating condition. They will then be able to directly correct the potential deficit of the patient using physical therapy, muscular strengthening, foot orthosis and gait rehabilitation [20, 23].

During all the phases of the management a psychological support of the patient is required, even if the patient should never be considered as a "psychiatric patient" [4]. In fact, an "unexplained pain" may sometimes be interpreted as "no cause = no real pain" but and this equation should particularly not be followed [4]. Sometimes a psychological approach may be required and this idea should be introduce with caution to the patient [4].

Conclusion

Pain after TKA do occur and the first step is to identify a potential cause for this pain following a rigorous algorithm. Sometimes, however, no cause can be found. Two categories of patients can be individualized: patient with isolated pain and patients with pain and stiffness. When revision TKA is performed without previous identification of an etiology of the pain and the stiffness, only modest improvements after revision have to be expected [7–9] as demonstrated in the literature with gain of flexion comprised between 18 and 49 degrees and percentage of considered "clinical success" comprised between 14.2 and 89%. When revision surgery is performed for isolated pain, results are also bad. Therefore when no cause can be found revision surgery should not be performed and a conservative management should be proposed. Significant functional improvements have been obtained in the literature following a multidisciplinary conservative management and treating all the medical conditions that may potentially cause the pain can be helpful for this category of patients.

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СВЕДЕНИЯ ОБ АВТОРАХ:
Sebastien Parratte – Department of Orthopaedic Surgery, Sainte Marguerite Hospital, Marseille, France
e-mail: sebastien@parratte.fr;
Kornilov Nikolai N. – Vreden Russian Research Institute of Traumatology and Orthopaedics, St. Petersburg, Russia
e-mail: drkornilov@hotmail.com;
Thienpont Emmanuel – University Hospital Saint Luc, Brussels, Belgium
e-mail: emmanuel.thienpont@uclouvain.be;
Andrea Baldini – IFCA Clinic, Florence – IRCCS Instituto Clinico Humanitas-Rozzano, Milan, Italy
e-mail: drbaldiniandrea@yahoo.it;
Tikhilov Rashid M. – director of Vreden Russian Research Institute of Traumatology and Orthopaedics, St. Petersburg, Russia
e-mail: info@rniito.org;
Argenson Jean-Noël – Department of Orthopaedic Surgery, Sainte Marguerite Hospital, Marseille, France
e-mail: jean-noel.argenson@ap-hm.fr;
Kuliaba Taras A. – Vreden Russian Research Institute of Traumatology and Orthopaedics, St. Petersburg, Russia
e-mail: taraskulyaba@hotmail.com.

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