

Nederlands Tijdschrift
voor
Orthopaedie

Officieel orgaan van de Nederlandse Orthopaedische
Vereniging



stryker

Triathlon



88%

“Patients with the Triathlon Single Radius Design were satisfied or very satisfied at 1 and 5 years”**

99%

“Evaluation of revisions for any reason showed Kaplan-Meier aseptic and all-cause survivorship of the femoral and tibial components was 99%”*

100%

“Assessment of aseptic loosening revealed that survivorship of the tibial and femoral components was 100%”*



* "Long-Term Survivorship and Clinical Outcomes of a Single Radius Total Knee Arthroplasty" Jaydev B. MISTRY, MD et al, Orthopaedic Surgery SURGICAL TECHNOLOGY INTERNATIONAL XXVIII"

** "Five-year survivorship and patient-reported outcome of the Triathlon single-radius total knee arthroplasty" Chloe E. H. SCOTT et al, Knee Surg Sports Traumatol Arthrosc DOI 10.1007/s00167-014-2922-8

Voorwoord

“Artsen ontvingen vorig jaar 5,6 miljoen euro aan sponsorgeld van de farmaceutische industrie. De best betaalde arts ontving in 2015 ruim 38.000 euro. Het gaat onder meer om onkostenvergoedingen voor dienstverlening.”

Dat schrijft de Volkskrant begin september. In de orthopedie gaat het niet zo zeer om banden met en betalingen van de farmaceutische industrie, maar veelal om de hulpmiddelenindustrie. Dat zal ongetwijfeld een van de aandachtspunten zijn als er een volgend onderzoek gedaan zal worden. En hoe staan wij als orthopeden er dan voor?

Velen van ons leggen hun betalingen vast in het zogeheten Transparantie-register. Hierin staat 85% van de orthopeden geregistreerd. De laatste update dateert van 2015. In de hier geciteerde zinnen zit de crux van het verhaal: ‘sponsorgeld’ en ‘dienstverlening’. Sponsoring en donatie suggereert het ontvangen van geld waarbij de tegenprestatie ofwel afwezig is (donatie) of het naamsgebruik inhoudt voor verkoopdoeleinden (sponsoring). Dienstverlening suggereert het verlenen van een dienst, een tegenprestatie. Het maken en houden van presentaties, het doen van wetenschappelijk onderzoek, het instrueren van collegae op een kadavercurcus of tijdens live surgery vereist tijd en inspanning en vertegenwoordigt een duidelijke tegenprestatie. Het is dus niet zo dat er niets gedaan wordt voor dit geld, er wordt werk voor verricht. Dit mag mijns inziens best betaald worden volgens de gangbare vergoedingsnorm. Dit staat ook zo in onze gedragsregels met randvoorwaarden omschreven. Sponsoring is eigenlijk het juiste woord als de industrie een fellowship of een congres ondersteunt. Volgens de NOV, NEFEMED en EUCOMED gedragsregels gaat dit geld niet direct naar een arts maar naar de zorginstelling of een congresorganisatie. En op wiens conto moet een dergelijke overeenkomst dan eigenlijk worden bijgeschreven: de arts, de instelling, de beroepsorganisatie? In het register kan alleen op naam van de arts worden geregistreerd. Zo simpel is het invullen van onze disclosures dus helaas niet.


En wat heeft de patiënt daar dan aan? Want daar doen we het ten slotte allemaal voor! Een goed samenwerkingsverband tussen de orthopedisch chirurg en de orthopedische industrie kan bijdragen aan verbetering van de patiëntenzorg en komt daarmee ten goede aan de patiënt. Zonder enige band met de medische industrie is er geen innovatie en vooruitgang, dan komt de geneeskunde tot stilstand en daar wordt de patiënt de dupe van. Vergeet ook niet dat de industrie gebonden is aan strenge compliance regels. Een dergelijk geregistreerd partnerschap is niet ‘vies’ en betaling voor dergelijke extra activiteiten moet niet verward worden met verlies van professionele integriteit of zelfs omkoping. Het is betaling voor geleverde diensten en inderdaad dient dat geregistreerd te staan in het Transparantieregister.

Dit voorwoord en de meningen erin zijn persoonlijk en vertegenwoordigen niet die van het NOV bestuur. Ook zijn zij niet per se de mening van de Redactieraad van het NTVO, de medische industrie, mijn vakgroep of het ziekenhuis waarin ik werk.

Dr. Taco Gosens, hoofdredacteur


Inhoud

Voorwoord	76
Taco Gosens	
A painful elbow - rare pathology of osteoid osteoma	78
Jetske Viveen, Sjaak I.F. Kodde and Denise Eygendaal	
Does post-clinical physical therapy after total hip replacement lead to better functional recovery?	83
Tim Janssen, Johann de Jong and Petra Heesterbeek	
Primary intraosseous gout of the patella and recurrent gout in the bipartite patella - a report of two cases	88
Eduard J. de Valk, Lucas C. Wassink, Taco Gosens and Bart C.H. van der Wal	
Avulsion fracture of the apophysis of the iliac crest in a young soccer player - a case report	93
Geert W. Hendriks, Melinda M.E.H. Witbreuk, Lieke M.A. de Vries and Jeremy G.A. Amaya	
A single hyaluronic acid injection for the treatment of pain associated with glenohumeral osteoarthritis - a case series	96
Petra E. Flikweert, Nienke Wolterbeek and Jacco A.C. Zijl	
A surgical repair technique for posterior sternoclavicular epiphyseal fracture-dislocation	103
Anton H. Hosman, Adelgunde V.C.M. Zeegers and Dagmar R.J. Kempink	
Proefschriften	108
Rob P.A. Janssen Jetze Visser	
Van de Vereniging	111

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De Vereniging heeft als doel:

- Het bevorderen van studie en het verbreiden van kennis van de conservatieve en operatieve orthopedie onder artsen.
- Het behartigen van de sociale belangen van de artsen die de orthopedie uitoefenen, zowel binnen de vereniging als daar buiten.

Het Nederlands Tijdschrift voor Orthopaedie is het officiële orgaan van de Nederlandse Orthopaedische Vereniging. Het heeft ten doel de leden van de Vereniging en andere geïnteresseerden te informeren over ontwikkelingen op orthopedisch gebied, waarbij zowel klinische als fundamentele aspecten worden belicht. Deze doelstelling wordt verwezenlijkt in de vorm van oorspronkelijke artikelen, editorials en verslagen van wetenschappelijke vergaderingen, met name die van de NOV. Naast verenigingsnieuws wordt ook aandacht besteed aan recent verschenen literatuur en proefschriften. Voorts worden congressen, symposia en workshops op het gebied van de orthopedie aangekondigd.

Beweringen en meningen, geuit in de artikelen en mededelingen in deze publikatie, zijn die van de auteur(s) en niet (noodzakelijkerwijs) die van de redactie. Grote zorgvuldigheid wordt betracht bij de samenstelling van de artikelen. Fouten (in de gegevensverwerking) kunnen echter niet altijd voorkomen worden. Met het oog hierop en omdat de ontwikkelingen in de medische wetenschap snel voortschrijden, wordt de lezer aangeraden onafhankelijk inlichtingen in te winnen en/of onderzoek te verrichten wat betreft de vermelde diagnostische methoden, doseringen van medicijnen, enz. De redactie wijst elke verantwoordelijkheid of aansprakelijkheid voor (de juistheid van) dergelijke gegevens van de hand en garandeert noch ondersteunt enig produkt of enige dienst, geadverteerd in deze publikatie, noch staat de redactie garant voor enige door de vervaardiger van dergelijke produkten gedane bewering.

Conform de richtlijnen van de Inspectie voor de Gezondheidszorg (sectie reclamatoezicht) zijn reclame-uitingen voor en productinformatie van receptgeneesmiddelen door farmaceutische bedrijven in het Nederlands Tijdschrift voor Orthopaedie alleen gericht op personen die bevoegd zijn om de betreffende geneesmiddelen voor te schrijven.

A painful elbow - rare pathology of osteoid osteoma

www.ntv-orthopaedie.nl/viveen2303/

Jetske Viveen, Sjaak I.F. Kodde and Denise Eygendaal

Vol
23

sept
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Osteoid osteoma of the elbow is rare. In this case a 35-year-old male patient had complained about pain in his elbow for three years. The pain worsened at night and could be relieved by NSAIDs. A plain X-ray did not show abnormalities. Therefore, a computed tomography (CT) -scan and a bone scintigraphy were performed. A small nidus in the proximal ulna was noticed about the proximal-ulnar joint. Although CT-guided percutaneous radiofrequency ablation (RFA) is the preferred therapy of osteoid osteoma, we opted for surgical resection in our case. The location of the ulnar nerve on the medial side and the radial head on the radial side made it impossible to reach the lesion using percutaneous techniques. Three months after surgery the pain had vanished. A diagnosis of osteoid osteoma of the elbow should be considered in young adults with persistent nocturnal bone pain responding well to NSAIDs or salicylates. Treatment modality depends on the patient's needs and the anatomical location of the nidus.

Introduction

Osteoid osteoma is a benign neoplasm of bone that represents approximately twelve percent of all benign bone tumors.¹ Fifty to 60 percent of the osteoid osteomas appear in the long bones, mainly in the femur and tibia.² Up to 25% of the lesions occur in the upper extremity³ and in only three percent of all cases is the elbow affected.⁴ Only a few cases of intra-articular osteoid osteomas have been reported.^{1,5,6} The male-to-female sex ratio is 3:1 and the incidence is the highest in the second and third decade of life.^{3,7}

Bone pain is the most common symptom, which typically worsens at night and increases with activity. The pain responds well to non-steroidal anti-inflammatory drugs (NSAIDs) or salicylates.

The diagnosis is often delayed, since osteoid osteomas may mimic a frozen elbow, arthropathy, synovitis or epicondylitis. This may lead to a reduced quality of life.⁸

In this case report we describe a recently encountered case of intra-articular osteoid osteoma situated at a challenging location in the elbow.

Case report

A 35-year-old healthy man visited our outpatient clinic with persistent pain in his dominant right elbow. The pain had started suddenly three years earlier after a period of increased physical activ-




Figure 1. Preoperative plain radiograph.

ity at his work in the office. The patient history was negative for trauma or any other health problems such as tendinitis or inflammatory diseases. He used to be a judoka in the past and because of the elbow pain he had to give up judo. The pain worsened at night and caused frequent waking, but could be relieved by NSAIDs.

Intensive physiotherapy, including massage, dry needling and stretching, did not relieve the pain.

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Figure 2. Coronal slide of the preoperative CT-scan: Small abnormality of the proximal ulna at the proximal radio-ulnar joint. 

During physical examination of the right elbow forced supination provoked pain. Both the right and the left elbow were stable and showed full range of motion. No abnormalities were found dur-

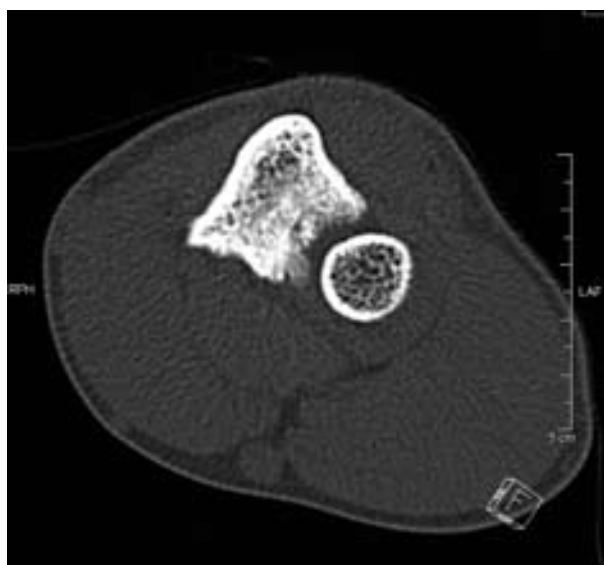



Figure 3. Axial slide of the preoperative CT-scan: Small abnormality of the proximal ulna at the proximal radio-ulnar joint. 


ing provocation tests of the biceps tendon and the lateral epicondyle.

A plain X-ray (Figure 1) showed no abnormalities, and since an osseous disorder was suspected, an additional CT-scan was performed. The CT-scan matched the suspicion of an osteoid osteoma (Figures 2, 3 and 4), although there was no sclerotic border visible. Therefore a supplementary bone scintigraphy and a single photon emission computed tomography (SPECT)-scan (Figures 5 and 6) were made confirming the diagnosis, as intense uptake around the proximal radio-ulnar joint was seen.

The elbow is a complex joint with many neurovascular structures in its proximity. Because of the challenging intra-articular location of the nidus, it was eliminated through open surgical resection. The Kocher's approach was used, after which the radial head was dislocated to the anterior. Mild synovitis of the proximal radioulnar joint was seen at the location where the osteoid osteoma was expected. Then, a needle was placed into the nidus to confirm the location with fluoroscopy (Figure 7). After confirmation of the location, a broad square around the osteoid osteoma was removed. Histology showed irregular confluent trabecular bone with, in between, a highly vascular stroma, confirmative of osteoid osteoma.

Currently, there are three methods of treatment available for osteoid osteoma; conservative therapy with NSAIDs, CT-guided percutaneous radiofrequency ablation (RFA) and surgical excision. If an osteoid osteoma would not be treated, complete resolution of symptoms may occur within six to fif-



Figure 4. Sagittal slide of the preoperative CT-scan: Small abnormality of the proximal ulna at the proximal radio-ulnar joint. 

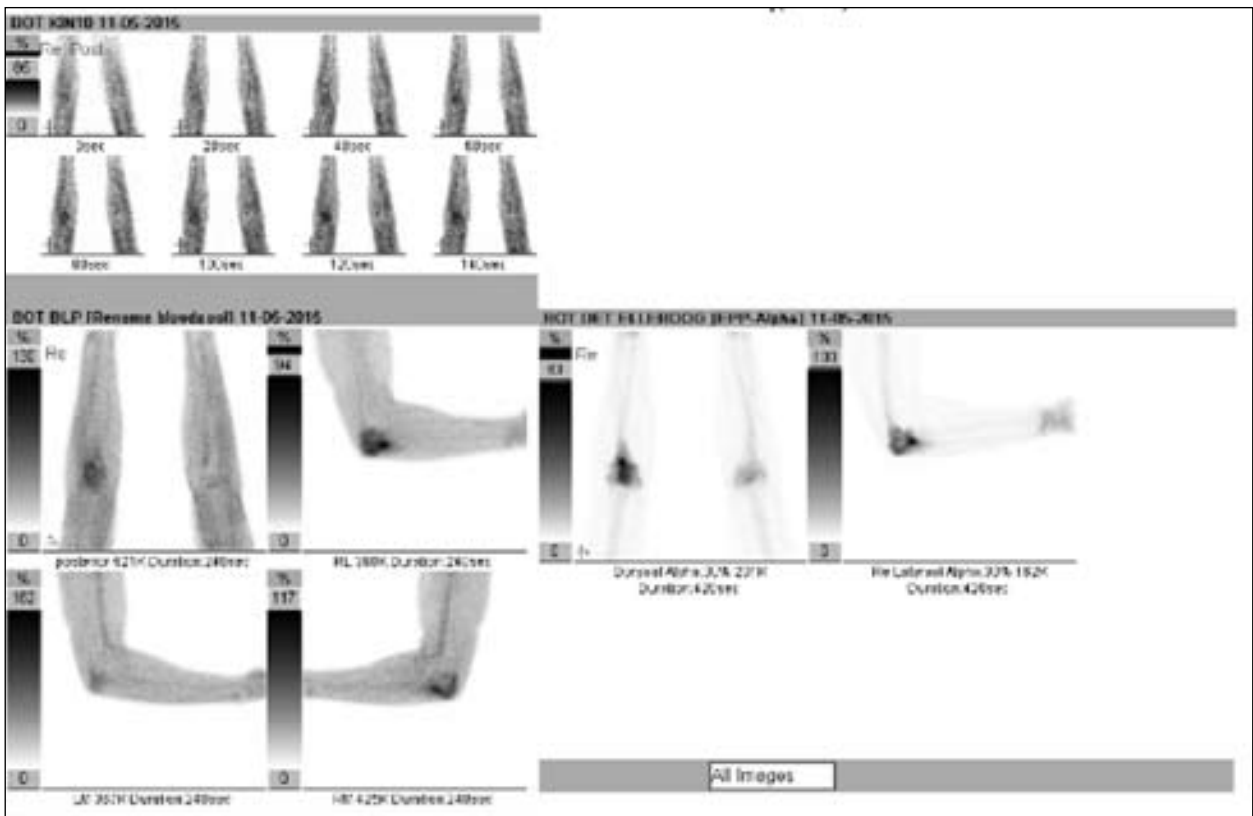



Figure 5. Bone scintigraphy. 

teen years.⁹ NSAIDs can reduce this period to about two to three years¹⁰, but most patients prefer a swift solution by an invasive intervention. CT-guided RFA has various benefits compared to surgical resection; it is less invasive, more accurate, causes less bone destruction, shortens the hospitalization time and the safety and efficacy are

reported to be equal or even better.^{11,12} However, surgery is still the preferred method of treatment in cases where the location of the lesion precludes percutaneous techniques.¹³


Fourteen weeks after surgery the patient visited the outpatient clinic again. He had made an effortless recovery and postoperative pain management was not indicated anymore. Only mild pain was noticed while forcefully rotating the elbow.

A plain X-ray of the elbow showed the area of resection just about the proximal radio-ulnar joint (Figure 6). The patient is scheduled for follow-up.

Discussion

Because an osteoid osteoma of the elbow is rare, completing the diagnosis could be a challenge. The patient history is essential to diagnose an osteoid osteoma, as several pathologies may be mimicked. When a patient between 20 and 40 years of age visits the outpatient clinic complaining of bone pain that worsens at night, which can be effectively relieved by NSAIDs or salicylates, the diagnosis of an osteoid osteoma should be taken into account. Physical examination however is not very discriminating. Other than the patient history, radiological examination is necessary. Plain X-rays are the initial di-



Figure 7. Perioperative fluoroscopy. 

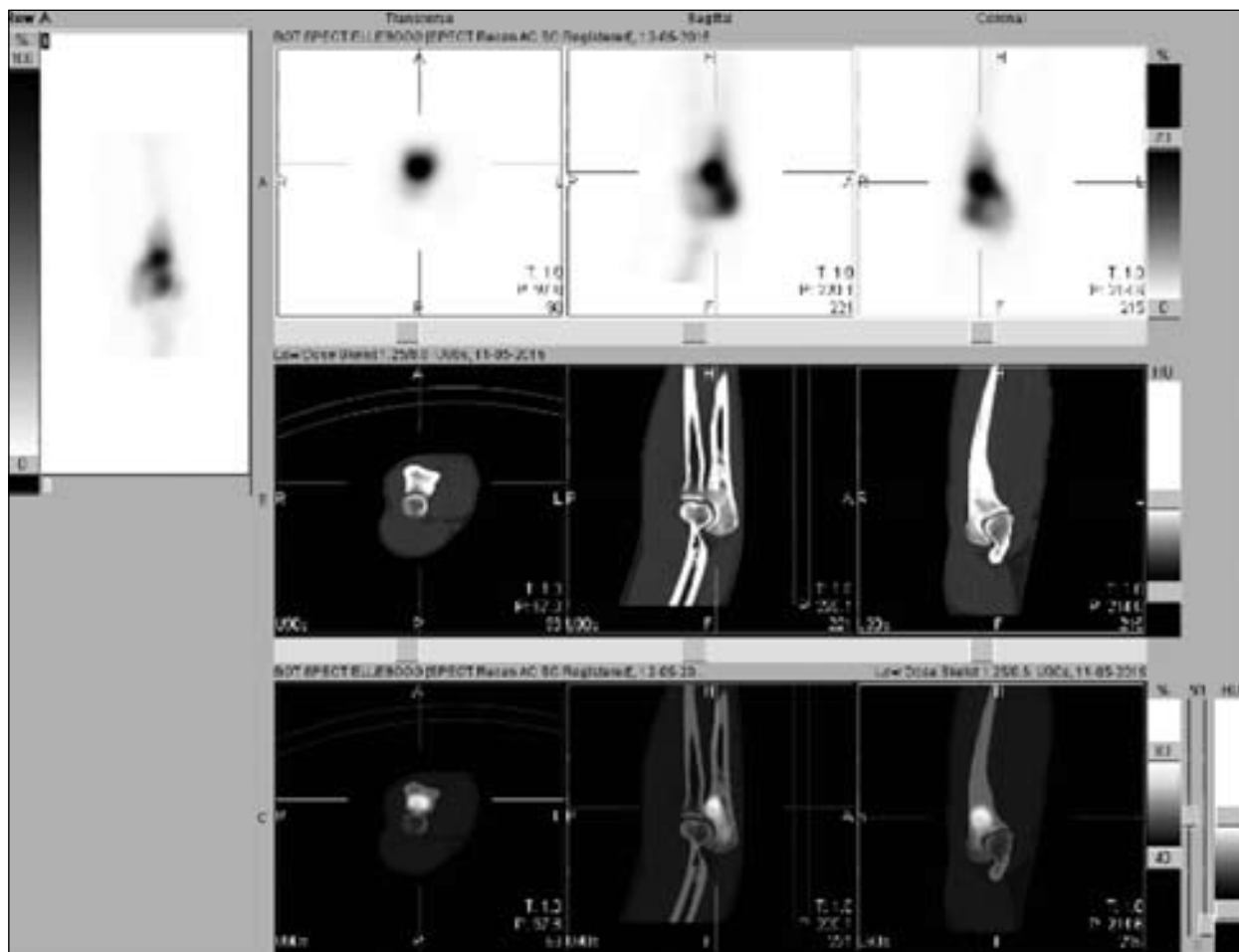



Figure 6. SPECT-scan: Hotspot about the proximal radio-ulnar joint. 



Figure 8. Postoperative plain radiograph. 

agnostic tool of choice.¹³ However, as in our case, about 25 percent of osteoid osteomas are not visible on plain radiographs.¹⁴ CT-scan, bone scintigraphy or SPECT-scan is the next step in the evaluation. An osteoid osteoma has three characteristic radiological features on a CT-scan; osteosclerosis, joint effusion and periosteal reaction.⁶ Except for diagnosing, a CT-scan localizes the nidus exactly and is therefore useful for the pre-operative planning.⁹ The double-density sign (Figure 3) on a bone scintigraphy is pathognomonic for osteoid osteoma.¹⁵ It shows an intense area of radiotracer uptake in the region of the nidus and less in the reactive bone. If bone scintigraphy uptake is subtle, a SPECT-scan can detect small lesions.¹⁶ Magnetic Resonance Imaging (MRI) is not required for diagnosis, but may be helpful in showing the inflammatory reaction produced by osteoid osteoma and in excluding other associated pathology.^{1,2,17}

Nowadays, CT-guided RFA is the preferred therapy of osteoid osteoma. As mentioned before this method has various benefits compared to surgical resection or conservative therapy. Prerequisites for CT-guided RFA are an accessible location of the

nidus and maintenance of a safe distance of 1 cm from important neurovascular structures.¹⁸ Since the osteoid osteoma of our patient was localized at the proximal radio-ulnar joint, we opted for surgical resection. The location of the ulnar nerve on the medial side and the radial head on the radial side made it impossible to reach the lesion using percutaneous techniques. A study by Rosenthal et al. showed no significant difference between CT-guided RFA and surgical resection with regard to the rate of recurrence.¹¹

In short, a diagnosis of osteoid osteoma of the elbow should be considered in young adults with persistent nocturnal bone pain responding well to NSAIDs or salicylates. Moreover, treatment modality depends on the patient's needs and the location of the nidus.

Disclosure statement

The authors declare that they have no conflicts of interest.

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Does post-clinical physical therapy after total hip replacement lead to better functional recovery?

Tim Janssen, Johann de Jong and Petra Heesterbeek

Vol
23

sept
'16

Introduction

A lot of research has been done to investigate if physical therapy after total hip replacement (THR) is effective. So far, the results are inconclusive. One explanation could be that the studies are very diverse in type of therapeutic intervention, duration and when the therapy starts after surgery. This case series was originally a randomized controlled trial (RCT) investigating whether post-clinical physical therapy, compared to no physical therapy, after THR leads to a better functional recovery. The study was terminated prematurely after 3 years because the inclusion rate was too low: because patients from the whole country visit our specialized hospital, only a small portion came from the hospital's postal code area. Further, some patients refused to participate due to transportation problems. Other patients did not participate because they preferred physical therapy after discharge. Although the study is not finished and we have not yet published the results, this research question is still actual and relevant as this topic is one of the prioritized research questions of the NOV Zorgevaluatie Agenda. This study was approved by the IRB: Commissie Mensgebonden Onderzoek and is registered under file number: 2007/276. The authors have nothing to disclose.

Patients

The patients were on the waiting list for a THR as a treatment for their hip osteoarthritis. After being asked by their surgeons, the patients were contacted by the research nurse who provided further information and arranged the informed con-

sent procedure. Patients were asked to participate when full weight bearing was to be expected, when they lived in the Nijmegen region (postal code within reach for the physical therapist) and were younger than 75 years old (due to a lower chance of co-morbidity and possible after care). Patients were excluded if they had rheumatoid arthritis, if they could not communicate in Dutch and if they were to be discharged to a nursing home or rehabilitation facility. Furthermore, they were excluded when there was a clinical reason for physical therapy after discharge, when they had symptoms on the contra-lateral hip, or when patients could not follow treatment due to physical, emotional or neurological conditions.

Intervention

All patients (whether in the treatment group or control group) were operated and received treatment according to the standard protocol. All THRs were placed by a postero-lateral approach. Before discharge, a baseline measurement was performed. Randomization occurred for patients who had had no complications during the hospital stay and who had no indication for physical therapy at home. Randomization took place on the day of discharge.

Patients in the treatment group received treatment by a physical therapist from the orthopedic department hip group. The physical therapist first determined the patient's medical history and performed a physical examination. The physical therapist, in collaboration with the patient, formulated the treatment goals according to the Patient Specific Complaints Scale (PSK). Thus, each patient received a personalized treatment protocol, not a standardized regime. After these individual treatment goals had been formulated, the treating physical therapist determined the program that would be necessary to accomplish these goals.¹ For example, the program could include the optimization of motion, muscle strength and balance to create optimal function related to the patient's specific goals.

In general, the patient was treated at the orthopedic department once or twice a week for a period

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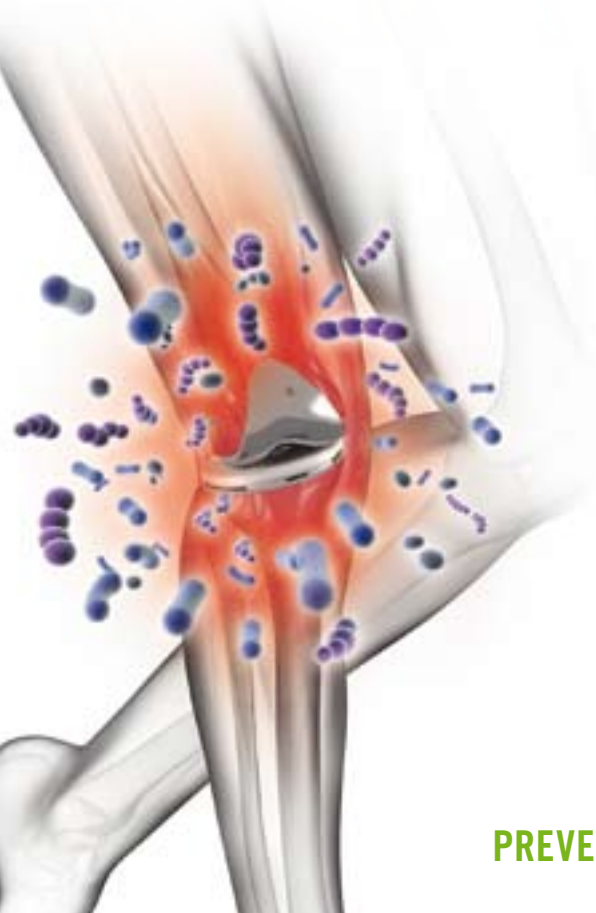
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Table 1. Patient characteristics.

	Treatment group (N=7)	Control group (N=7)
Age: median(min - max)	57.8 (46.4 - 67.7)	56.0 (46.1 - 64.0)
Gender: M / V	5 / 2	3 / 4
Operated side: L / R	4 / 3	5 / 2
Other pathologies	1 ipsilateral knee arthroscopy 1 ipsilateral foot surgery	1 contralateral knee arthroscopy

of eight weeks. In agreement with the patient (e.g. in case of transportation problems) it was possible that the patient was treated at home.

Comparison

After discharge, patients in the control group received no physical therapy, only instructions with regard to the quality and quantity of walking, and for hip extension exercises. The Dutch Orthopaedic Association (NOV) states in the guideline for Total Hip Arthroplasty that a home based exercise regime or physical therapy might help in recovering from a THR operation.² They also state that the evidence so far is weak.

Outcome

From all patients, the following baseline data were collected: secondary pathology as well as the standard patient characteristics. The Harris Hip Score (HHS) and the Oxford Hip Score (OHS) were completed pre-operatively; before discharge, the PSK was completed.^{1,3,4} The subjects who participated in this study, were followed according to standard follow-up which was planned at the regular post-operative controls (CPO). These were at eight weeks and six months. During these follow-up visits the HHS, the OHS and the PSK were again administered. The PSK has been validated in Dutch.⁵

All outcome measures were compared between the experimental group and the control group with the non-parametric Mann-Whitney U test. Ten per cent improvement in the PSK at 8 weeks postoperatively (primary outcome) was considered to be clinically relevant. However, to the best of our knowledge, there is no literature available concerning this value. Differences in the number of patients who were classified as showing ten per cent improvement between the groups were tested with the Chi-square test. A score between 34 and 41 on the OHS is considered good and above 41 is considered very good. The OHS version used was the 0-48 score.⁶ With the HHS a score of 80 or higher is considered to be good

to very good. The median and range for the descriptive statistics were presented. A p-value of <0.05 was considered to be statistically significant.

Thirty-two patients were eligible for inclusion. However, only fourteen participated in the study: four patients declined to participate; the other eleven did not meet the inclusion criteria: lack of baseline assessment (three), physical therapy at home prescribed at discharge (five), or patients had had a complication requiring other therapy (three). Three patients who agreed to participate were still on the waiting list for their THR when the study was terminated. The patients' characteristics are summarized in Table 1.

At baseline, there were no significant differences between the treatment group and the control group regarding the PSK, the HHS, and OHS. After eight weeks, the group receiving physical therapy scored statistically significant better on the PSK and HHS; after six months, this difference was no longer statistically significant (Figures 1 and 2). Concerning the OHS, here the treatment group scored statistically significant higher not only at the 8-week follow-up but also at the 6-month follow-up (Figure 3).

At the 8-week follow-up, an improvement of at least ten per cent on the PSK was found in both groups: six patients from the treatment group and five patients from the control group, a non-significant difference ($p = .91$). After six months, all patients showed this improvement. After eight weeks, six out of seven patients in the treatment group had the highest classification on the HHS versus only one patient in the control group having this score ($p = 0.013$, one missing). After six months, five patients in each group had this classification (four missing). The OHS showed the same pattern: after eight weeks four out of seven patients in the treatment group had the highest classification whereas in the control group no patient had that score ($p = 0.026$, one missing). After six months, although this effect was still visible, it was no longer statistically significant ($p = 0.058$, two missing in each group).

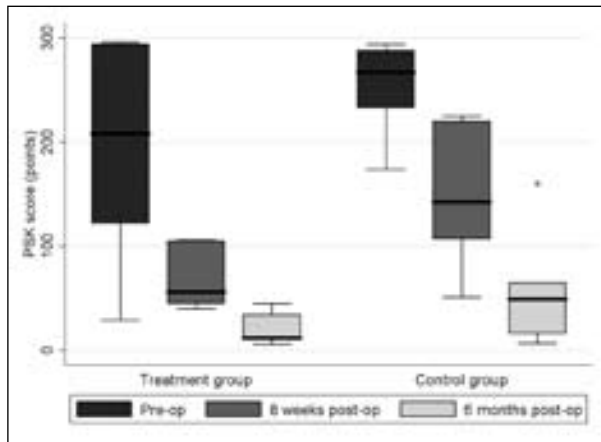


Figure 1. Box plot of the Patient Specific Complaints Scale for the treatment and control group for the different follow up moments. The thick horizontal black line in the box represent the median.

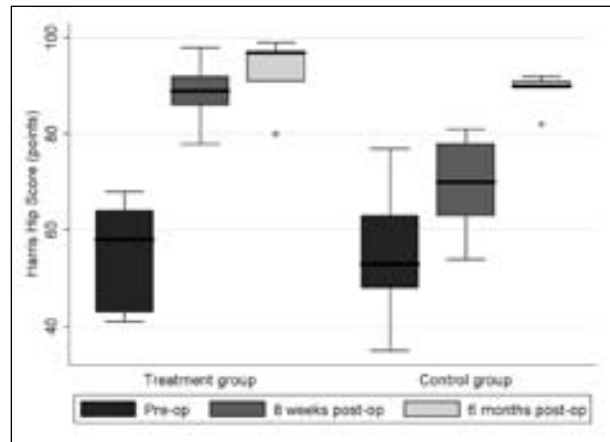


Figure 2. Box plot of the Harris hip score for the treatment and control group for the different follow up moments. The thick horizontal black line in the box represent the median.

Relevant literature

In the literature, there is still no consensus on the effectiveness of post-clinical physical therapy. The majority of papers indicate that physical therapy, compared to home-based exercises, does indeed have a positive contribution to the recovery 3 months after surgery and that this positive effect is no longer present at 12 months postoperatively.⁷⁻¹⁴ One study found improvement in muscle strength and walking speed but not in improvement in quality of life in favour of the physical therapy group.¹⁵ On the other hand, some other studies suggest that there is no difference in improvement between the groups.¹⁶⁻²⁰

One explanation for finding no difference could be that the specific goals of the patients were not taken into account and each patient regard-

less of individual wants or needs received a standard treatment protocol. By looking at the patients goals from the PSK and consequently adapting the treatment to achieve these individual goals, we were able to evaluate functional improvement in the aspects of daily living that were important to each individual patient.

There is also evidence in the recent literature that there is loss of muscle strength that begins early after surgery and remains without training.^{21,22} To prevent this, the patients should start with exercises as soon as possible after their THA. The study by Skoffer et al. shows that resistance training is feasible shortly after surgery.²³

Recommendations

In this study on the effect of post-clinical physical therapy after total hip replacement on functional recovery, the group that received physical therapy showed an earlier functional recovery than the control group. Eight weeks after the operation, there was a statistically significant improvement on all three outcome measures (PSK, HHS and OHS) in comparison to the group that received no therapy. After six months, the two groups showed no difference on the PSK and HHS, but the therapy group continued to show statistically significant improvement on the OHS. Note that because of the small sample size and resulting low power these results have to be interpreted with some care. Nevertheless, taking this into account, our study indicates that favorable effects of post-clinical physical therapy may be present.

In 2014, 28.026 THAs were performed, 53% in patients who were 69 years or younger.²⁴ There will be an increase of these numbers because of the aging

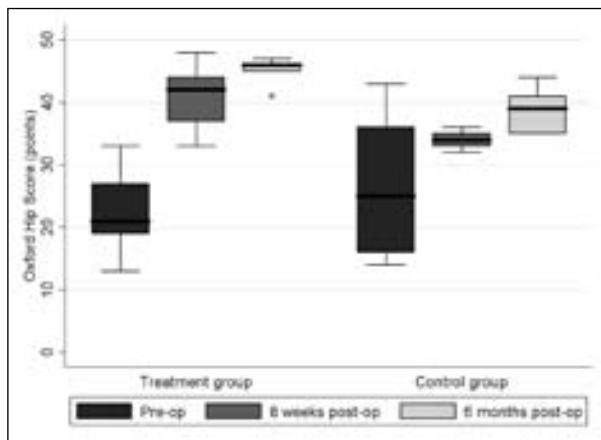


Figure 3. Box plot of the Oxford hip score for the treatment and control group for the different follow up moments. The thick horizontal black line in the box represent the median.

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society and increasing obesity.²⁵ Early improvement in the physical therapy group may not seem important, but for this group it means that these patients are able to take care of themselves earlier after surgery and are less dependent on after care. They may therefore be able to participate in social activities sooner, with a possible increase in quality of life. Early improvement also means earlier return to work. Tilbury et al. investigated that after THA 25% to 95% of the patients return to work between 1-12 months and the people who worked preoperatively returned to work between 1.1 to 10.5 weeks after surgery.²⁶ Earlier return to work has also economic advantages. One physical therapy session costs between 28-40 euro and one sick day is approximately 225 euro.^{27,28} In The Netherlands, physical therapy after THR is compensated for by the primary health care package after the first 20 treatments. For the first 20 treatments the patients need to pay or they need supplementary insurance.

To summarize, when reviewing the existing literature and also the results of our study: physical therapy after discharge, providing that the treatment is personalized, home-based, early enough after surgery and with the right intensity, has a positive effect on functional recovery. Future studies are needed to investigate this and the outcome should be taken into account when the Dutch Orthopaedic Association (NOV) guideline "Totale Heupprothese" will be updated.

Disclosure statement

Nothing to disclose.

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Primary intraosseous gout of the patella and recurrent gout in the bipartite patella - a report of two cases

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Eduard J. de Valk, Lucas C. Wassink, Taco Gosens and Bart C.H. van der Wal

Vol
23

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Gout of the (bipartite) patella is rare and therefore not always recognized. We present a case of primary intraosseous gout of the patella and a case of gout in the bipartite patella, both treated conservatively. In most previous reported cases this condition was found secondary in traumatic fractured patellas or in young active patients who had been treated operatively. No guidelines are available and different treatments, both operatively and non-operatively, have been reported in the past. The aim of this report is to show that conservative treatment can lead to good results when treating gout in the patella.

Introduction

Gout is caused by chronic hyperuricaemia resulting in deposition of urate crystals in joints and tendons. This relatively common condition mostly

affects the auricular cartilage and the first metatarsal phalangeal joint. Peloquin and Graham were the first reporting intraosseous gout of the patella in 1955.¹ Only a limited number of cases of intraosseous gout of the patella have been described



Figure 1. Anteroposterior (A) and lateral (B) X-rays showing expansive osteolytic lesions with a sclerotic rim.

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since.¹⁻¹⁷ Seventy to ninety percent of intraosseous tumors of the patella are benign, most frequently identified as: chondroblastoma, giant cell tumor and aneurysmal bone cyst.¹⁸⁻²¹ Few cases of non-neoplastic lesions have been reported concerning osteomyelitis, brown tumor (osteitis fibrosa cystica) in hyperparathyroidism and intraosseous gout.²¹ Intraosseous gout of the patella is uncommon and therefore not always recognized.

Sometimes gout is localized around a bi- or tripartite patella and becomes symptomatic. Soft tissue involvement together with bone destruction makes the patella more prone to fracturing or dislocation.^{2,7,9,10,13,16} In order to reduce symptoms

and prevent pathologic fracturing several treatment options have been discussed in the past. The aim of this report is to show that conservative treatment can lead to good results when treating gout in the patella. We present a case of primary intraosseous gout of the patella and a case of gout in the bipartite patella both treated conservatively.

Patient 1

A 58-year old man was referred by his general practitioner. He had a history of rheumatoid arthritis and non-Hodgkin lymphoma stage IIa, wherefore he had been treated successfully with ABCD chemotherapy (Adriamycine, Bleomycine, Vinblastine en Dacarbazine) in 2006.

The past six months he had experienced right anterior knee pain, combined with limited weight bearing. No previous episodes of gout or a history of trauma had been reported. He presented at the orthopaedic outpatient clinic with a slight diffuse swollen knee, restricted range of motion and tenderness over the patella.

Intervention

Conventional X-rays of the right knee showed, besides minimal signs of osteoarthritis, an extensive sclerotic cyst, covering about 70% of the patella (Figure 1A and 1B). Magnetic resonance imaging showed widespread soft tissue lesions in close relationship to the patella and patellar cysts. Elevated serum urate levels (600 $\mu\text{mol/L}$) and additional biopsy (Figure 2) of the synovial mass confirmed the diagnosis: tophaceous gout.

Comparison

Unfortunately, there is no guideline including a treatment algorithm for gouty tumors of the patella. We classified the intraosseous lesion as a 'Stage 1 latent lesion' according to the Musculoskeletal Tumor Society (MSTS) Staging System, as presented in 1986 by W.F. Enneking. A primary conservative treatment at this stage might be successful. According to this staging system, operative treatment is retained for active and invasive tumors or fractures.²²

Outcome

After diagnosis he was referred to his rheumatologist who started colchicine and allopurinol, after which serum urate levels, joint effusion and pain were normalized at the six monthly follow-up.

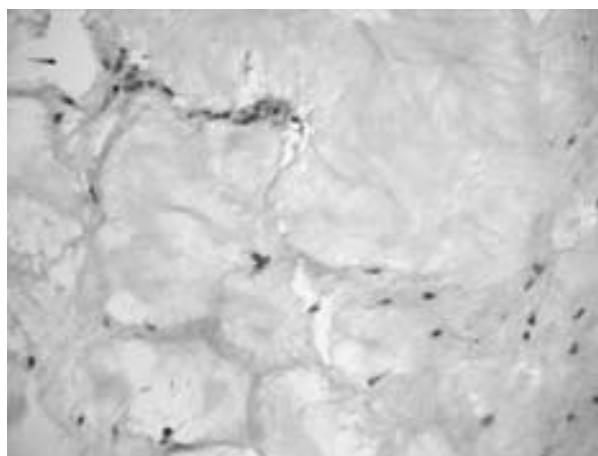


Figure 2. Microscopic view of biopsy: note the finely structured radial crystalline structure confirming gout (original magnification 200x).

Patient 2

A 48-year old man presented with recurrent non-traumatic complaints of his right knee. He had a history of gouty arthritis of the ankle joint according to his general practitioner, treated with non-steroidal anti-inflammatory drugs. Although this had never been confirmed by laboratorial tests or biopsy. Usually, the symptoms of the knee disappear spontaneously. But during this episode the knee stayed swollen, warm and painful, in particular anteriorly. There was an extension deficit of 30 degrees and flexion was limited to 90 degrees.

Intervention

Conventional X-rays (Figure 3) of the right knee showed a bipartite patella with diastasis of the accessory bone. Because of the non-specific beginning of the symptoms, additional investigation was performed. Ultrasound imaging revealed next to the joint effusion, granular and amorphous depositions with increased vascularization, most suspicious for gout. A non-steroid anti-inflammatory drug was prescribed and he was referred to the rheumatologist who confirmed the diagnosis of gout by biopsy and elevated serum urate levels.

Comparison

Several cases of deposition of urate crystals in the bipartite patella have been reported, concerning only men between 27 and 41 years of age.^{5,9,10,14,16} Four of them had a history of gout and they were all treated operatively in which the accessory bone was removed.



Figure 3. Anteroposterior (A) and lateral (B) X-rays showing a bipartite patella with diastasis of the accessory bone. ■

Outcome

Because of the sudden onset and the absence of tophi, the rheumatologist prescribed colchicine and allopurinol first, after which symptoms dissolved within one month and up to one year after no recurrence was reported.

Relevant literature

Gout is a crystal arthropathy and the most common cause of inflammatory arthritis in adult men during their twenties. However, (primary) involvement of the patella in gout is extremely rare.^{15,21} Intraosseous tophi, as seen in the first patient, can simulate a neoplastic process indicated as gouty pseudotumor.¹⁵

Non-traumatic anterior knee pain is mostly associated with chondromalacia, but can also be the first sign of a tumor of the patella. Less than 1% of all bone tumors are located in the patella and are mostly benign (73 vs. 27%).^{20,23,24} Most common benign tumors of the patella are giant cell tumors, chondroblastomas and aneurysmal bone cysts.^{20,24} Other than gout, non-neoplastic tumors can also concern tuberculosis osteomyelitis, hyperparathyroidism or pigmented villonodular synovitis.^{21,25,26} Malignant tumors of the patella such as osteosarcoma, lymphoma, chondrosarcoma and metastatic disease have been reported.

Radiographic features such as the margin of the lesion, cortical involvement, trabecular pattern and type of the matrix contribute to the diagnosis.^{12,20} In case of gout, the longer it exists, the more marked the radiographic findings. Lytic lesions of the patella with adjacent soft tissue calcification are seen on conventional X-rays, whereas nodular soft tissue masses and both intra- and periarticular erosions are best identified on MR imaging.^{15,21,27} Soft tissue extension can also be part of malignancy or other non-neoplastic lesions which, if suspected, require first a biopsy and blood tests.²⁷

One assumes that intraosseous tophi arise by deposition of urate in bone marrow or by penetration of urate through the articular cartilage.²⁸ In the bipartite patella, Kobayashi et al. suggested that deposition of urate crystals is induced by a pre-existent inflammatory reaction, enthesopathy in the vastus lateralis or chronic synovitis between the accessory bone and the patella. Inflammatory cytokines induced by monosodium urate crystals stimulate osteoclasts and chondrocytes, which promote bone erosion and secondary fracturing.^{5,10,14,29}

Taking into account the medical history of the first patient, non-Hodgkin's lymphoma involving the patella was the main concern. Primary localization of non-Hodgkin's lymphoma in the patella has only been described in a few reports.^{25,30,31} Generally, in patients over 40 years of age intraosseous gout, metastasis and intraosseous ganglion are the most

common lesions involving the patella.²¹

Sometimes gouty tophi of the patella are only seen as an additional finding in patellar fractures, treated successfully with osteosynthesis or partial patellectomy.^{8,13,21,29,32} If pain persists, arthroscopically removal of gouty tophi has also been performed with good results.^{5,9,10,14,25} This raises the question of whether extensive cysts, as seen in our patient, should be operated in order to prevent fracturing of the patella.

Some suggest that curettage should only be considered for patients with stage 1 or 2 benign lesions and patellectomy is indicated for patients with stage 3 aggressive benign tumors.^{10,14,20,22,33} According to the MSTs Staging System, operative treatment is retained for active and invasive tumors or fractures. So, for our patients a primary conservative treatment might be successful.²² In contrast to the previous discussed literature, conservative treatment can lead to good results, even in case of secondary fracturing.⁸

Recommendations

We believe that adequate drug treatment should be the first step in therapy, with frequent follow-up of clinical symptoms and urate serum levels. The anterior knee pain and joint effusion is a result of intracapsular reactions in response to crystal arthropathy. Conservative treatment seems justified, even in case of secondary fracturing, and gives similar results as an operative therapy.^{8,22} If pain and joint effusion persists, despite urate lowering drug therapy, secondary curettage of the cyst, or removal of the accessory bone should be considered with or without arthroscopic debridement.^{5,9,10,14,16,34}

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Avulsion fracture of the apophysis of the iliac crest in a young soccer player - a case report

Geert W. Hendriks, Melinda M.E.H. Witbreuk, Lieke M.A. de Vries and Jeremy G.A. Amaya

Vol
23

sept
'16

Introduction

Avulsion fractures of the apophyses often occur in adolescent athletes.^{1,2} These traumatic avulsions are generally caused by a sudden or forceful contraction of the attached muscle.¹⁻³ Most of the time, the location of avulsion originates at the ischial tuberosity, anterior inferior iliac spine or the anterior superior iliac spine, while iliac crest avulsion fractures are rare.² We present a case of avulsion fracture of the iliac crest in a young soccer player.

Patient

A 16-year old recreational soccer player presented with pain and reduced strength in his left leg. Three weeks earlier, he experienced a sudden onset of pain of his left pelvic region after kicking a ball with his right leg whilst playing soccer. Physical examination showed painful hip flexion and abduction against resistance and a painful sensation in the pelvic region. Conventional X-rays showed a massive avulsion fracture of the apophysis of almost the whole wing of the left iliac crest with caudal dislocation, Figure 1. An additional CT-scan or MRI was not necessary since the X-rays gave a conclusive diagnosis.

Intervention

Since there are no strict guidelines about treatment, we discussed the treatment options and expected outcomes and risks with the patient and decided for conservative treatment to avoid any surgical risks. Conservative treatment consisted of partial weight bearing using crutches and to avoid



Figure 1. Anteroposterior X-Ray of the pelvis with an avulsion fracture of the apophysis of the iliac crest (L).

any sport activities. Six weeks after the initial trauma, the pain was reduced and the patient was instructed to gradually increase weight bearing on both legs with supervision of a physiotherapist. 12 weeks after his trauma, the patient could walk without any limitations or pain. An X-Ray showed extensive consolidation and the patient started constructive training with his soccer team, Figure 2.

Comparison

There is no consensus whether this avulsion fracture of the apophysis should be treated operatively or conservatively. An argument to perform surgery could be the size of displacement or the location of the avulsion site. Some authors suggest surgical treatment if the fracture displacement is more than 2-3 cm, to prevent symptomatic non-union.^{4,5} A different argument for surgery is the possible reduction in time to return to sports, though Porr et al. concluded no differences regarding recovery time for surgical versus conservative intervention in patients with pelvic avulsion fractures.^{1,6} Due to surrounding fascia and periosteum, displacement of avulsion fractures is often minimal which makes conservative treatment favourable.⁷ Conservative treatment mainly consists of partial weight bearing and gradually increasing load in time. If this treatment fails, a bracing technique could be used.⁸

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Figure 2. Anteroposterior X-Ray of the pelvis 12 weeks after trauma.

Outcome

12 weeks after the initial trauma the patient experienced no functional limitations or pain. At 18 weeks, he could fully return to sports and play soccer at the same level as before trauma.

Discussion

An avulsion fracture of the iliac crest is a rare injury. In an observational study of 1238 X-rays of the pelvis, Rossi et al. reported 1.6% avulsion fractures of the iliac crest and 203 avulsion fractures of the pelvis apophysis.² Avulsion fractures are most commonly seen among skeletally immature athletes between 14 and 17 years old due to weakness across the open apophysis. The most common sites and muscles involved are the anterior superior iliac spine (sartorius), anterior inferior iliac spine (rectus femoris), ischial tuberosity (hamstrings), and less commonly the lesser trochanter (iliopsoas).^{2,9} Different muscles have their origin or insertion at the iliac crest: transverse abdominal muscles, internal and external obliques, gluteal musculature, iliacus muscle and the (tensor) fascia lata. All muscles are used by twisting and turning of the pelvis, conceivable when shooting a ball. Given the location and direction of dislocation and the abduction pain described in this case study, it probably concerns an avulsion of the fascia lata.¹⁰

Our literature search revealed a few similar case reports, though these reports described similar treatment strategies for patients with significant smaller avulsion fractures or described a similar magnitude of avulsion fracture with a surgical intervention.^{7,11-14} Kong et al. described a similar case in which the patient experienced a sudden on-

set of pain while playing basketball.⁵ X-rays showed a small avulsion fracture of the anterior superior iliac spine. Since the patient developed sensory disturbance one week later, an open reduction with internal fixation was performed using three cannulated screws to fixate the apophysis. Post-operative non-weight bearing with crutches was permitted followed by two weeks partial weight bearing and four weeks full weight bearing. After eight weeks, normal physical activity was permitted including contact sports. Li et al. reported a case series of ten patients who were surgically treated.⁴ Only one case was described with imaging showing a slightly smaller but comparable injury to our case. This study reported satisfying results concerning surgical treatment: all ten patients could commit full weight bearing activities after two weeks and returned to sports four weeks after surgery, resulting in a quicker return to sports after surgery compared to conservative treatment. However, in three patients revision surgery was necessary to remove the screws.^{6,7} In a report by Lambert et al. a minor iliac crest avulsion was described which was successfully treated with minimal weight bearing for two weeks and sports restriction for six weeks.⁸ After six weeks, the patient could return to sports successfully without complaints. Three other reports described comparable cases with comparable treatment options and outcome.^{11,13,14} All these cases concerned an avulsion of the iliac crest with minimal dislocation (less than the width of the apophysis).

Recommendation

Our case study showed that conservative treatment consisting of partial weight bearing, is a successful treatment option in a patient with a large avulsion fracture of the iliac crest. If a quick return to sports is requested, surgery could be considered, although revision surgery to remove the screws could be necessary.⁶ Perhaps a quicker return to sports was possible in our case after surgery, but given the patient's preferences we advised conservative treatment with careful return to sports when there was significant consolidation shown on the X-Ray.

Based on current literature, no conclusive recommendation could be made about treatment options, yet conservative treatment seems to be sufficient. Treatment options should be discussed thoroughly with the patient with consideration of rehabilitation time, surgical risks, mal- and non-union and the ability of returning to previous physical activity.

Disclosure statement

Nothing to disclose.

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A single hyaluronic acid injection for the treatment of pain associated with gleno-humeral osteoarthritis - a case series

Petra E. Flikweert, Nienke Wolterbeek and Jacco A.C. Zijl

Vol
23

sept
'16

Background: Intra-articular injections of hyaluronic acid (HA) have become increasingly popular as part of conservative therapy to manage pain associated with osteoarthritis of different joints. Treatment with most HA products requires a series of 2-5 injections. A HA product for patients with shoulder osteoarthritis is commercially available, requiring only one injection while assuming the same therapeutic efficacy. Such injections could be a welcome extra modality in the conservative treatment of patients with pain secondary to degenerative shoulder joint disease. This study was undertaken to assess if a single intra-articular injection of HA would be applicable in clinical practice. It was hypothesized that a single intra-articular injection of HA would lead to pain relief, increase in quality-of-life and functional improvements in patients with osteoarthritis of the shoulder.

Methods: In this prospective case series, before injection and 3 months afterwards, patients were evaluated using a pain score, RAND-36, EQ-5D and the Constant Murley Score.

Results: Fourteen consecutive patients were enrolled in the study. The orthopaedic surgeon was satisfied with the injection procedure in 10 patients (71%), reasonable in 1 (7%), moderate in another (7%) and poor in 2 patients (14%). Four patients verbally reported considerable increase in pain after the injection; one patient verbally reported major pain relief. Three months after injection, half of the patients scored lower on the pain score, and half of the patients scored higher. None of the dimensions of the RAND-36, EQ-5D and Constant Murley Score significantly changed.

Conclusion: Considering the limitations of this study and the disappointing usability of the product, the applicability and efficacy of a single intra-articular injection of this type of HA in patients with osteoarthritis of the gleno-humeral joint remains inconclusive.

Introduction

Degenerative osteoarthritis of the shoulder is a common entity in aging adults. Patients with shoulder osteoarthritis complain of gradually increasing pain in the shoulder and a decreasing range of motion.¹ In addition, shoulder osteoarthritis is associated with a diminished quality-of-life.² Conventional non-operative treatment for symptomatic glenohumeral osteoarthritis include physical therapy, analgesia and non-steroid anti-inflammatory drugs.¹ A suprascapular nerve block can be considered in patients as non-responsive compared to the established conservative treatment options.³ If symptoms do not respond adequately to conservative treatment, surgical treatment may be the next step. Currently, intra-articular injections are part of conservative therapy. Corticosteroids mixed with a local anaesthetic is widely used, but provides only temporary pain relief.^{4,5} Besides, there is a potential risk of damaging tendons and ligaments.⁶

Therefore, there is no clear role of injectable corticosteroids in the treatment of patients with gleno-humeral osteoarthritis.^{7,8} Unlike injections with corticosteroids, viscosupplements are thought not to have this negative side effect. Intra-articular injections of hyaluronic acid (HA) have therefore become increasingly popular in the last two decades managing pain associated with osteoarthritis of different joints. In several studies, HA has been shown to be safe and possibly effective in treating patients with painful osteoarthritis in the gleno-humeral joint.^{5,9-14} These findings are confirmed with a likely benefit of HA injections over steroid injections by a meta-analysis of nineteen randomised controlled trials, in which a series of HA injections were used in the treatment of chronic shoulder pain.¹⁵ In a more recent review it was concluded that intra-articular infiltrations of HA are useful in patients with gleno-humeral osteoarthritis.⁸

HA is a naturally occurring biodegradable polymer with a variety of applications in medicine, including viscosupplementation for osteoarthritis treatment. In arthritic joints the concentration of natural HA and the average molecular weight of the HA molecules are reduced. This causes a reduction in the interaction between the HA molecules and ions and proteins, and thereby a reduction of the viscoelasticity of the synovial fluid.¹⁰ HA injections supplement the

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Table 1. Characteristics of the included patients (N=14).

Patient	Gender	Side	Age	OA AC joint	Degree of OA	Diagnosis	Satisfaction injection procedure	Physiologic saline used
1	Female	Right	85	Slightly	Questionable	RCA	Satisfied	No
2	Female	Right	61	Slightly	Moderate	RA	Satisfied	No
3	Female	Right	70	No	Severe	OA	Satisfied	No
4	Male	Left	55	No	Minimal	OA	Satisfied	No
5	Male	Right	72	Severe	Severe	RCA	Satisfied	No
6	Male	Left	56	Slightly	Questionable	OA	Satisfied	No
7	Male	Left	40	Slightly	Moderate	OA	Poor	No
8	Female	Left	31	No	Moderate	PA	Moderate	No
9	Female	Right	79	No	Severe	RCA	Reasonable	No
10	Male	Left	58	Minimal	Minimal	OA	Poor	No
11	Female	Left	67	Slightly	Severe	RCA	Satisfied	Yes
12	Female	Left	80	Slightly	Moderate	RCA	Satisfied	Yes
13	Male	Right	65	Slightly	Severe	OA	Satisfied	Yes
14	Female	Right	85	Minimal	Moderate	RCA	Satisfied	Yes

OA = osteoarthritis; RA = rheumatoid arthritis; PA = post-traumatic arthritis; RCA = rotator cuff tear arthropathy

shortage of hyaluronic acid in osteoarthritis thereby improving the natural functioning. The potential effect of HA in a degenerative joint may be a lubricating one, analgesic, and protective on cartilage.¹⁶⁻¹⁸

Treatment with most HA products requires a series of intra-articular injections, usually three to five. A different HA product for patients with shoulder osteoarthritis is commercially available, requiring only one injection while assuming the same therapeutic efficacy. Such a single injection product would be more convenient for patients and expected to be less invasive thus reducing the potential risk of joint infections or hypersensitivity reactions.

This prospective case series was undertaken to assess if a single intra-articular injection of HA would be applicable in clinical practice and would lead to pain relief, increase in quality-of-life and functional improvements in patients with osteoarthritis of the gleno-humeral joint. When this product indeed shows positive effects on pain and function, a randomised clinical trial will be conducted to compare this specific type of HA requiring only a single injection with the standard corticosteroids injection and a placebo.

Materials and Methods

Patients

Because the HA injection is an approved medical product and was offered as part of the regular

therapy, approval from the Institutional Review Board was not required. Patients above 18 years with a sufficient knowledge of the Dutch language were included if they had symptomatic shoulder osteoarthritis, including cuff arthropathy, avascular necrosis and posttraumatic osteoarthritis, with limitation of the mobility of the shoulder (in any plane) and pain during movement for at least 50% of the day for at least 1 month prior to study participation. Osteoarthritis had to be confirmed by an X-ray. Following the suggestion from Brander et al. (2010)¹⁴, the Kellgren and Lawrence Grading System modified for the shoulder was used to grade the osteoarthritis in the glenohumeral joint. The degree of osteoarthritis was graded as: grade 0 (no signs of osteoarthritis), 1 (questionable severity; minimal osteophyte and doubtful significance), 2 (minimal severity; defined osteophytes with unimpaired joint space), 3 (moderate severity; moderate diminution of joint space with osteophytes), 4 (severe; joint space greatly impaired, with sclerosis of subchondral bone, osteophytes and deformation of humeral head).

Patients were excluded in case of the following: symptomatic arthritis of the acromioclavicular joint; shoulder surgery in the past year; intra-articular HA injection in any joint in the past twelve months; intra-articular corticosteroids injection in any joint in the past three months; pregnant women or women planning to become pregnant;

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other medical conditions of the cervical spine or shoulder girdle like septic arthritis of the shoulder, severe frozen shoulder (retention of <20% of the movement range), gout or calcium pyrophosphate disease of the upper limbs in the previous twelve months, radiographic findings indicating an (acute) fracture of the proximal humerus shoulder girdle, neck pain caused by cervical osteoarthritis; general medical pathology like malignancy.

Outcome parameters

Before injection and 3 months afterwards, patients were evaluated using a 100mm horizontal visual analogue scale (VAS) pain score and two general health questionnaires (RAND-36 and EQ-5D). The orthopaedic surgeon performed a physical examination and filled out the Constant Murley Score (CMS). During the 3 months period, possible adverse events and complications were recorded.

The primary aim was to compare the VAS-pain before and after the injection. A reduction of 20mm on the VAS-pain will be considered a clinically relevant decrease in pain.^{19,20} Secondary outcomes were changes in the quality-of-life (RAND-36, EQ-5D) and the range of motion (CMS).

The RAND-36 questionnaire scores 8 dimensions of health including: physical functioning, social functioning, limitations caused by physical health problems (role physical), limitations caused by emotional problems (role emotional), mental health, vitality, bodily pain and general health perceptions. An additional single item assesses change in perceived health during the last 12 months. The overall score varies between 0-100, a higher score indicating a better general health status. RAND-36 has been validated for the Dutch population.²¹

The generic effects on quality-of-life was assessed with the EQ-5D (3 level).²² This widely used quality-of-life instrument includes five dimensions of health related quality-of-life, namely mobility, self-care, daily activities, pain/discomfort, and depression/anxiety. The five dimensions will be combined into a health index. The maximum index score of 1 represents full health with no problems in any of the dimensions. In addition, a 100-point vertical scale is included for the patient's self-perceived evaluation of his/her health state with the endpoints representing the best and worst imaginable health states.

The CMS is a shoulder evaluation instrument, divided into a subjective assessment by the patient (pain and daily activities: 35 points) and an objec-

tive assessment evaluated by the surgeon (range of motion and strength: 65 points). The maximum score of 100 indicates normal shoulder function with no symptoms.^{23,24}

Fermathron S

Fermathron Plus (Biomet Europe B.V./Hyaltech Ltd.) is a viscosupplement for intra-articular injection into the synovial space of patients suffering from osteoarthritis. It contains long-chain sodium hyaluronate produced by a continuous bacterial fermentation process. The advised dosage regime is an injection once a week for 3-5 weeks. Fermathron Plus is further developed into Fermathron S, the type of HA we used in this study. Fermathron S contains more HA molecules which are cross-linked thereby making it more effective. A possible advantage of the cross-linking is that the product will degrade less rapidly and may therefore have prolonged effect. This means in theory that these injections do not need to be given in series, a single injection might provide long-term pain relief. The Fermathron S consistency is thicker than that of the Fermathron Plus.

Injection procedure

At the injection site, at the dorsal side of the shoulder, approximately 1cm below and 1cm medial of the posterior angle of the acromion, the skin was sterilized with 75% alcohol. An intra-articular HA injection (3ml/69mg) was administered in the shoulder joint from posterior (21 gauge needle, 0.8x50mm) by an experienced shoulder surgeon. Fluoroscopic or ultrasound guidance was not used because at that time these techniques were not available in our outpatient clinic. After injection, the needle was removed and the injection site was covered with a bandage.

Statistics

Because of the small sample size, and not normally distributed data, all outcomes were analysed using Related Samples Wilcoxon signed-rank test. Results are expressed as median with its 95% confidence interval (CI). The significance level is 0.05. The data was analysed using SPSS (IBM, SPSS Statistics, version 21).

Results

Fourteen patients were enrolled in the study (8 females, 6 men) with a median age of 66 years. The median follow-up was 91 days. According to the modified Kellgren and Lawrence Grading System, five patients had severe osteoarthritis, five a moderate degree of osteoarthritis, two minimal and

Table 2. Results of the functional outcome parameters at baseline and follow-up.

Patient	Follow-up time (days)	Constant Murley Score		VAS-pain (mm)		Change in VAS-pain (mm)
		Baseline	FU	Baseline	FU	
1	133	40.0	31.1	100	66	-34
2	84	13.0	0.0	50	99	+49
3	198	33.3	29.3	100	53	-47
4	91	60.4	50.5	59	88	+29
5	Lost to FU	30.2	x	83	x	x
6	90	49.3	61.6	66	10	-56
7	138	60.5	62.5	64	41	-23
8	93	35.4	40.5	93	20	-73
9	91	21.0	8.5	64	76	+12
10	111	39.5	54.5	90	51	-39
11	70	56.5	17.1	52	68	+16
12	84	33.0	9.0	52	88	+36
13	91	53.5	56.5	48	65	+17
14	Lost to FU	18.0	x	77	x	x

Vol
23
sept
'16

another two questionable (Table 1). Two patients did not fill out the 3 months evaluation and were therefore lost to follow-up. They returned at the outpatient clinic at respectively 6 and 17 weeks with unacceptable pain. At that time, both patients were eligible for a reversed shoulder prosthesis due to cuff arthropathy. Before the injection, one of these patients had a CMS of 18 points which is worse compared to the rest of the group. All other scores from this patient were comparable to the group scores. The second patient scored worse on pain (83mm), however better on the RAND-36 and EQ-5D VAS (respectively 65.6 and 84 points) indicating a better general health state compared to the rest of the group (Table 2 and 3).

Pain

The median pain score at baseline was 65.0mm, and at 3 months 65.5mm ($p=0.388$). The median change in pain was a decrease of 5.5mm (Table 2). Besides the two patients who were lost to follow-up, four other patients verbally reported considerable increase in pain after the injection. One patient verbally reported major pain relief. Of the 12 patients, 3 months after injection 6 patients scored lower on pain (mean improvement of 45.3mm), and 6 patients scored higher (mean deterioration of 26.5mm); both clinical relevant changes (>20 mm).

Outcome parameters

None of the dimensions of the RAND-36, EQ-5D or CMS changed significantly between the base-

line and the three month evaluation (respectively $p=0.401$, $p=0.241$ and $p=0.289$) (Table 2 and 3).

Surgeons' perception

In three of the first ten patients (33%) the orthopaedic surgeon was not (completely) content with the injection procedure (poor or moderately satisfied). Therefore, in the last four patients physiologic saline was used to determine the correct placement of the injection. It was aspirated before the injection of HA was given. The use of physiologic saline resulted in a satisfying procedure. In addition, a switch was made to a larger needle gauge with a larger inner diameter (18 gauge needle (1.2x90mm)). In total, the surgeon was satisfied with the injection procedure in 10 patients (71%), reasonable in 1 patient (7%), moderate in another (7%) and poor in 2 patients (14%).

Discussion

This case series was designed to examine the applicability of a single intra-articular HA injection in our clinical practice and to evaluate the functional effect in patients with pain associated with gleno-humeral osteoarthritis. We ended this pilot study prematurely because there was an increase in pain in at least four of our patients and the injection procedure led to the surgeon's dissatisfaction. Conclusions about the efficacy of a single intra-articular injection of HA cannot be drawn based on the present study. Due to the experienced problems

Table 3. Results of the general health outcome parameters at baseline and follow-up.

Patient	EQ-5D VAS (perception of health state)		EQ-5D Index		RAND-36	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
1	85	65	21221	22221	55.6	43.5
2	39	30	33323	33332	12.6	18.9
3	70	65	21221	12232	38.7	52.6
4	75	60	21122	22222	56.2	49.7
5	84	x	21222	x	65.6	x
6	90	90	11221	11211	75.0	82.2
7	70	50	12222	12221	61.4	56.7
8	41	80	22222	22222	34.0	37.4
9	60	70	22231	22221	48.8	54.8
10	50	50	21231	21332	24.4	33.8
11	89	x	11221	12231	61.0	27.6
12	50	41	23321	23321	47.5	33.2
13	75	62	12221	22222	74.6	55.7
14	60	x	21121	x	60.0	x

Vol
23sept
'16

and disappointing usability of the product, a randomised controlled trial will not yet be conducted. However, when setting up a similar study, we would advise a follow-up study with ultrasound-guided infiltrations, performed with a large diameter needle in a homogeneous population.

Several limitations to this study should be discussed. First of all, this study was designed as a pilot project, resulting in a small group, heterogeneous in age, diagnosis and in stage of osteoarthritis with a short follow-up. Because of the small group and the heterogeneous character of our study population we cannot conclude whether the deterioration of pain in half of our patients and the improvement in the other half was due to the injection or (to the progression of) their osteoarthritis. The inclusion of patients with different diagnosis including rotator cuff tear arthropathy is therefore highly debatable. In studies concerning knee osteoarthritis it is assumed that patients younger than 65 years of age and those with the initial and intermediate radiographic stage of osteoarthritis benefit more from intra-articular injection of HA.²⁶⁻²⁸ In contrast, in shoulder studies, these results are conflicting. Merolla et al. (2011)⁵ demonstrated in a low quality retrospective study that lower clinical advantages were found in patients with greater degree of osteoarthritis. However, Brander et al. (2010)¹⁴ injected HA in 36 patients with a moderate to severe osteoarthritis, resulting in improved pain and function in those patients. Most patients

in our study had moderate to severe osteoarthritis. Another explanation of the increase in pain in some patients might be a painful post-injection reaction of HA, although this occurs in only 1-2% of patients and the pain does not last more than 1-3 days.¹¹ Due to the short follow-up of 3 months and the absence of an interim measurement at 6 weeks we could have missed important information on the efficacy of the intervention.

Second, there was unequivocal bias regarding the injection procedure. The most important aspect is the blindly performed infiltrations with a posterior approach, which have been associated with success rates of 42-85%.²⁹⁻³¹ Image-guided injections are more accurate in reaching the intra-articular space than free-hand performed injections.^{29,30} Since we did not perform ultrasound, we were likewise not aware of possible joint effusion of the injected shoulder, which might play a role as a negative predictor. In addition, the high viscosity, caused by the increasing cross-link density and HA concentration,^{16,32} made the supplement hard to inject. The complete lack of tactile feedback while injecting, which is a very important factor in non-image guided intra-articular injections, led to the surgeon's dissatisfaction and subsequently to two violations of the study protocol. Both, the injection and aspiration of saline as well as the change to a larger needle diameter, might have caused unintentional effects. To our knowledge, no other study concerning intra-articular HA injections reported difficult administration of HA.

Noël et al.¹¹ showed in a prospective multicentre study that 52% of patients reported good pain relief after a single injection: the mean VAS-pain score decreased significantly after intervention of one (in 17 patients) or two (in 16 patients) intra-articular injection(s) of HA in patients with shoulder osteoarthritis with a follow-up of 6 months. Although a loss to follow-up of 4 patients (12%) due to unacceptable pain was mentioned, they concluded that HA is a feasible, safe and probably effective treatment in patients with shoulder osteoarthritis. Nevertheless, the results of different studies concerning HA should be interpreted cautiously. Printz et al.³³ demonstrated in a review that, like the study of Noël et al.,¹¹ the majority (63%) of studies on HA injections for knee osteoarthritis are industry funded and that the qualitative conclusions are associated with a financial conflict of interest with the sponsoring pharmaceutical company. This potential conflict of interest could account for the more favourable conclusions regarding the efficacy of HA. Although, the HA injections in the present study were provided free of charge, there was no financial conflict of interest and the pharmaceutical company did not have any interference in the treatment of our patients, the data analysis, or the writing of this manuscript. Another issue making it difficult comparing studies, is that trials investigating HA-therapy have not been uniformly well-designed and there is a large variation in used products. These products differ in their method of production, molecular weight, dosing instructions and therefore possibly clinical outcomes. These divergent methods limits definitive conclusions regarding HA treatment and the treatment continues to be controversial in the gleno-humeral as well as in other joints.

Conclusion

Considering the multiple uncertainties and bias of the present study, the usability of the product was disappointing and conclusions about the efficacy of a single intra-articular injection of HA cannot be drawn. We would advise a follow-up study with ultrasound-guided infiltrations, performed with a large diameter needle in a homogeneous population.

Disclosure statement

Biomet Europe B.V. for providing the Fermathron S capsules free of charge for the duration of this study. Biomet Europe B.V. was not involved in any other aspect of this study, like data analysis or writing of this article. The authors declare that they have no conflict of interest.

Institutional Review Board

For this study, approval from the Institutional Review Board was not required.

This article was reviewed by the editor-in-chief and one deputy-editor, and it underwent open review by one or two outside experts. The deputy-editor reviewed each revision of the article, and it underwent a final review by the editor-in-chief prior to publication. Final corrections and clarifications occurred during one or more exchanges between the author(s) and the language corrector.

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A surgical repair technique for posterior sternoclavicular epiphyseal fracture-dislocation

www.ntv-orthopaedie.nl/hosman2303/

Anton H. Hosman, Adelgunde V.C.M. Zeegers and Dagmar R.J. Kempink

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A 17-year-old male patient was seen in the emergency department for pain in his right shoulder after an assault. CT scan revealed a posterior dislocation of the right sternoclavicular joint. With a suspicion of either a sternoclavicular dislocation or a posterior sternoclavicular epiphyseal fracture-dislocation, the patient was taken to the operating theatre for closed and potentially open reduction. After failed closed reduction, a new surgical technique for repair of a posterior sternoclavicular epiphyseal fracture was performed using a Mitek anchor with absorbable sutures.

Introduction

The medial clavicular epiphysis is the last physis to close in the human body. Consequently, a sternoclavicular epiphyseal fracture-dislocation can occur in patients up to 25 years of age.¹ Although this is an uncommon injury, early diagnosis and appropriate intervention gives the best results in this incapacitating and potentially lethal injury.^{2,3} The initial treatment of choice remains closed reduction for the acute sternoclavicular dislocation and sternoclavicular epiphyseal fracture-dislocation.⁴ However, reduction quite often proves to be unsuccessful⁵, in particular if applied more than 48 h after dislocation.⁶

Various surgical techniques have been described in literature, including closed and open reduction with K-wire or plate and screw fixation. The use of hardware devices has been criticized. First of all, there is a potential danger of K-wire migration towards vital structures with possible catastrophic complications.⁷ Secondly, the use of a plate and screw fixation can damage the epiphyseal plate and requires the removal of the plate after 3 months.^{8,9} Suture stabilisation techniques have been proven safe and effective for sternoclavicular dislocation^{1,10}, however, there is a paucity in literature on the surgical techniques for sternoclavicular epiphyseal fracture-dislocation. The purpose of this report is to describe a new simple surgical technique using suture anchors to stabilize a posterior sternoclavicular epiphyseal fracture-dislocation.

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Patient


A 17-year-old patient was seen in our emergency department after an assault resulting in immediate pain in his right shoulder. He did not experience paresthesia, weakness or dyspnoea. His vital signs were within normal ranges. On physical examination, range of motion in the right shoulder was limited by pain, except for a full pain free endorotation and exorotation. No pain during pressure on his chest was objectified. The distal extremity was examined and was reported to be neurovascularly intact. On conventional X-rays no traumatic lesions were observed (Figure 1). CT scan of the thorax



Figure 1. Preoperative X-thorax AP at first presentation on the emergency room: No sign of bony injuries or articular dislocations is seen.

revealed a posterior dislocation of the right sternoclavicular joint (Figure 2), which, due to his age, raised suspicion towards a Salter Harris type I fracture. After obtaining parental informed consent,



Figure 2. A. Axial view of preoperative superior chest CT: note the markedly displaced medial end of clavicle (arrow) compared to the sternum (S), suggestive for a right sided posterior sternoclavicular dislocation. The medial epiphyseal fracture is not seen on this scan. There is no evidence of secondary injuries of the mediastinal structures. B. Frontal view of 3D reconstruction of the superior chest CT. C. Axial view of 3D reconstruction of the superior chest CT. 

the patient was taken to the operating theatre for closed or potential open reduction under general anaesthesia. A thoracic surgeon was notified.

Intervention

First an attempt at a closed reduction was made. With the patient in a prone position with a sandbag between the shoulder blades, progressive longitudinal traction was applied to the right arm against counter traction in an abducted and slightly extended position. The medial end of the clavicle

was pulled in the anterior direction with a towel clip. The reduction was unsuccessful and preoperative antibiotic prophylaxis was provided, with subsequent sterile prepping and draping.

Surgical technique

The treatment comprised of the open reposition and internal fixation of the sternoclavicular epiphyseal fracture-dislocation. A longitudinal incision centred over the sternoclavicular joint was used, after which coagulated dissection of the platysma straight to the sternoclavicular joint. Periosteal elevation was performed in a lateral to medial direction over the clavicle, carefully exposing the medial end of the clavicle and sternoclavicular joint. At this point one can evaluate if there is a posterior sternoclavicular dislocation or a posterior sternoclavicular epiphyseal fracture-dislocation, which happened to be the case (Figure 3a). A towel clip on the medial clavicle was helpful in reducing the clavicle, while being cautious on the hemodynamic status of the patient after reduction. Reduction of the fracture did not provide stability. A Mitek GII suture anchor (DePuy, Warsaw, Indiana, U.S.) was drilled into the medial clavicle metaphysis (Figure 3b). The Mitek GII suture anchor absorbable sutures were placed through the epiphysis and tightened at the medial end (Figure 3c). Stability was subsequently tested with gentle ranging of the upper extremity and loading of the sternoclavicular joint. Lastly, the wound was rinsed with subsequent closure of the periosteal sleeve, fascia, subcutis and the skin itself.

Post-surgical rehabilitation regime

After-treatment consisted of cuff and sling-immobilization for 6 weeks, with subsequent initiation of physical therapy for gentle passive and active range-of-motion exercises. Patient was permitted to return to sports, 3 months postoperatively.

Outcome

A one-year follow-up revealed a patient with no pain or loss of function and a full range of motion of the right shoulder.

Comparison

This is the first surgical technique in repairing the sternoclavicular epiphyseal fracture-dislocation with the use of suture anchors positioned in the (medial) clavicle. A review on posterior sternoclavicular epiphyseal fracture-dislocations¹ reported the use

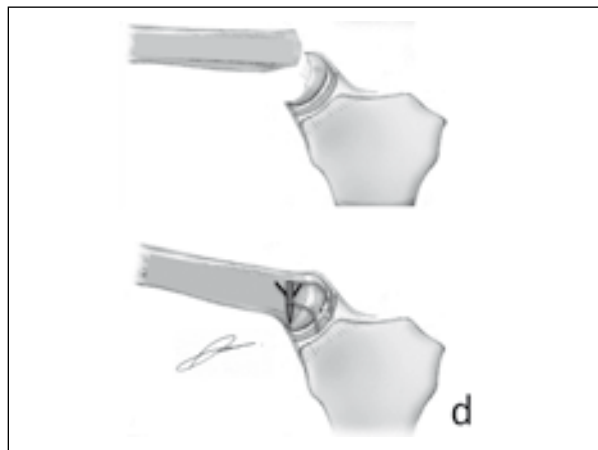
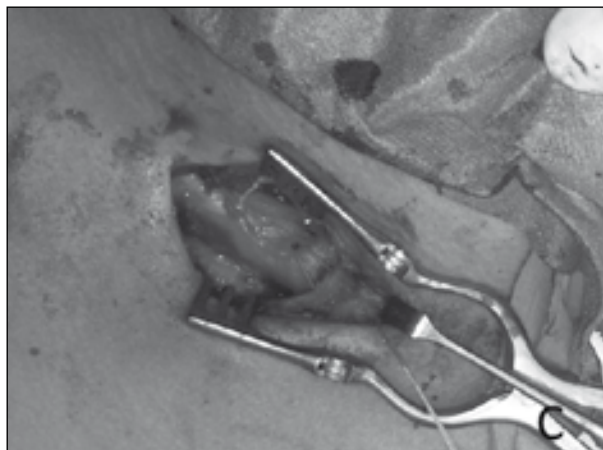


Figure 3. Three steps in surgical repair technique for posterior sternoclavicular epiphyseal fracture-dislocation. Figure 3a shows adequate exposure of a complete epiphysiolsis with a dorsal dislocation of the clavicle itself. With help of a cloth clamp subsequent reposition can be established. Figure 3b depicts a Mitek anchor G2 drilled in the medial clavicle with its soluble wires. Figure 3c shows the position of the soluble wires, which have penetrated the epiphysis and the periosteum. ■

of sutures alone in stabilization of the sternoclavicular joint.¹¹⁻¹⁴ Abbidin¹¹ described a technique for stabilization of sternoclavicular dislocation using anchors placed in the edge of the manubrium with sutures passing the medial end of the clavicle avoiding the articular surface. However, in the presented case of medial clavicle epiphyseal fracture fixation, suture anchors were positioned in the clavicle itself with the suture fixating the proximal epiphyseal fragment. In this technique there is no need for dissecting the manubrium and epiphyseal fracture stabilization might be improved due to the increased proximity of the anchors.

Significant complications can occur during the open reduction procedure due to vital structures that are in close proximity including a pneumothorax, thoracic outlet syndrome or lesions of trachea, oesophagus, great vessels or brachial plexus. Open reduction and internal fixation is not only reserved if closed reduction is unsuccessful, but also for non-acute cases.⁵ With reduction being less successful if applied more

than 48 h after dislocation⁶, it is not known if the suture anchor technique will hold for non-acute cases, as forces may be higher. However, Mitek anchor GII has proven to withstand tensile load forces well over 450 Newton¹⁵, and its superiority over sutures only has well been proven.¹⁶ In case of residual posterior instability of the sternoclavicular joint, additional ligamentous repair through local ligamentoplasty by means of subclavius or sternocleidomastoid tendon has been advocated.^{4,17} There is abundant literature on ligamentous reconstruction of sternoclavicular epiphyseal fracture-dislocations.^{17,18} However, some of these techniques are challenging¹⁹, due to its low incidence.^{6,20}

We acknowledge certain limitations of the suture anchor technique. First of all, due to the low incidence of the sternoclavicular epiphyseal fracture-dislocation, the authors report on only one successful case. In addition, use of suture anchors does necessitate postoperative immobilization, an approach preventing early postoperative functional rehabilitation.⁹

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Figure 4. Postoperative X-clavicle AP: Mitek anchor is visible in the medial clavicle. There is no sign of fracture or dislocation. 

Thirdly, we did not use MRI pre- and postoperatively to evaluate our surgical reduction. Lehnert et al. suggested MRI is more useful than CT scans in evaluating Salter Harris I fractures.¹⁰ An other advantage of the MRI, is the visualisation of mediastinal structures that are in danger with posterior sternoclavicular epiphyseal fracture dislocation: the trachea, oesophagus, lungs, great vessels, and brachial plexus. Frequently on the CT scan the clavicular metaphyseal displacement is misinterpreted as sternoclavicular dislocation because clavicular epiphysis is not ossified. Only meticulous attention to bony fragments anterior to the posteriorly dislocated clavicle can reveal a Salter Harris II epiphyseal fracture.^{1,21}

Here, we described a new surgical repair technique for posterior sternoclavicular epiphyseal fracture-dislocation. With a one-year follow-up, the patient is doing well without any symptoms. Medial clavicle positioned screw anchor suture stabilization of sternoclavicular epiphyseal fracture-dislocations seems to be a promising and simple technique.

Disclosure statement

The authors declare no conflicts of interest.

This article was reviewed by the editor-in-chief and one deputy-editor, and it underwent open review by one or two outside experts. The deputy-editor reviewed each revision of the article, and it underwent a final review by the editor-in-chief prior to publication. Final corrections and clarifications occurred during one or more exchanges between the author(s) and the language corrector.

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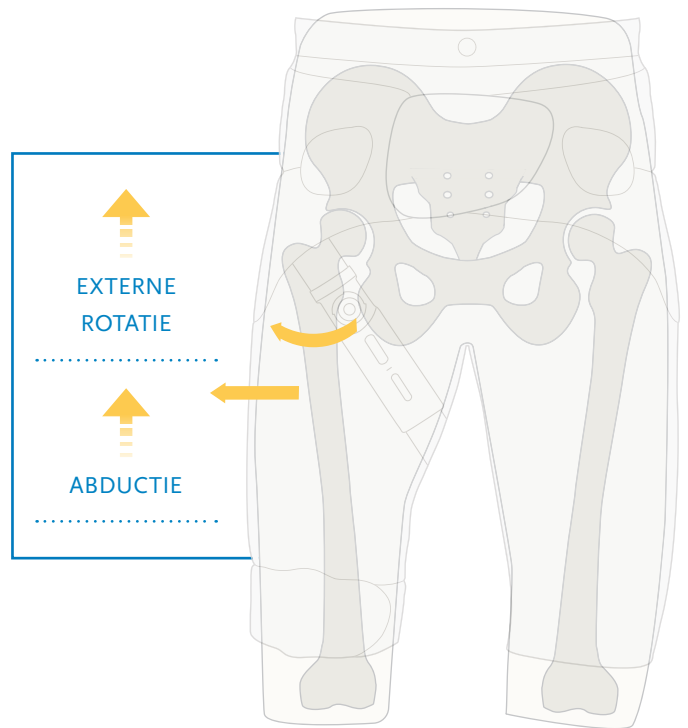
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NIEUW

Unloader Hip is een unieke oplossing voor osteoartrrose van het heupgewricht. Het geeft ondersteuning aan het heupgewricht, verbetert de mobiliteit en verlicht de pijn.

GEBRUIKSVRIENDELIJK - Dankzij de bekkenband met klittenbandsluiting en het eenvoudig op spanning te brengen compressiemechanisme, is Unloader Hip gebruiksvriendelijk en eenvoudig te verstellen.

DYNAMISCH - De rotatiecontroleband maakt het mogelijk om de heupabductie en de externe rotatiekracht op de gebruiker af te stemmen voor een verbeterde mobiliteit en pijnvermindering.



Proefschriften

Anterior cruciate ligament reconstruction & accelerated rehabilitation. Hamstring tendons, remodelling and osteoarthritis. Rob P.A. Janssen, Universiteit Maastricht, 26 mei 2016

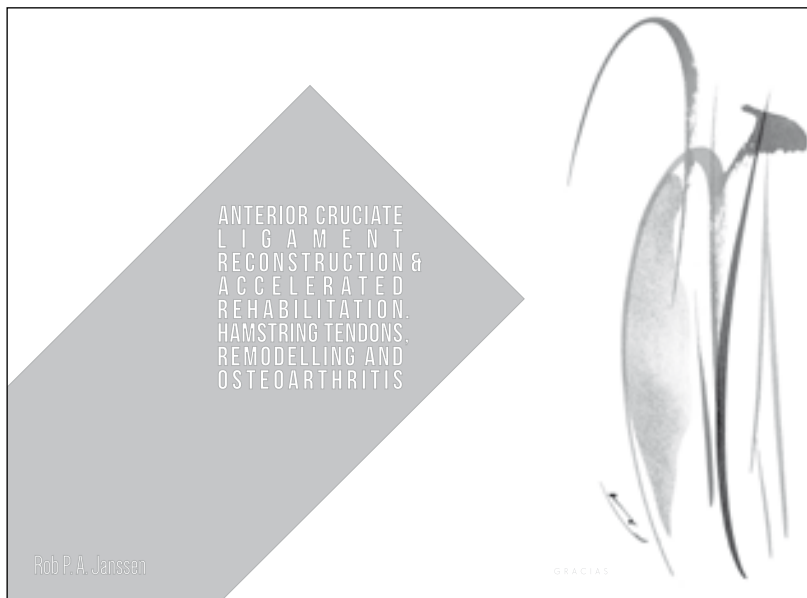
The incidence of anterior cruciate ligament (ACL) reconstructions increases, particularly in women as well as patients younger than 20 years and those above 40 years of age. Hamstring tendons continue to gain in popularity as graft source for ACL reconstruction and success rate varies between 55-95%. Successful ACL reconstruction requires understanding of several factors: anatomical graft placement, mechanical properties of the selected graft tissue, mechanical behavior and fixation strength of fixation materials as well as the biological processes that occur during graft healing. They influence directly the mechanical properties of the knee joint after ACL reconstruction and, therefore, determine the rehabilitation and time course until normal function of the knee joint can be expected.

The 1990's were the decade of autograft transition from patellar tendon to hamstring tendon autografts for ACL reconstruction in the Netherlands. Advocates argued that hamstring tendons were the preferred graft choice for ACL reconstruction because of superior strength, larger cross-sectional area for footprint recreation, graft tunnel conformity, biological incorporation, stability, and less donor site morbidity and anterior knee pain compared to bone-patellar tendon-bone

autografts. Return to sports was allowed at 4-6 months after ACL reconstruction. As a result, this surgical reconstruction technique became popular in combination with accelerated brace-free rehabilitation protocols and is still widely used today. The aim of this thesis is to gain insight in the characteristics and biology of hamstring tendons as well as long-term clinical outcome after hamstring tendon autograft ACL reconstruction with brace-free accelerated rehabilitation. A standardized surgical technique and accelerated rehabilitation protocol was used in all studies of this thesis.

The central part of the thesis encompasses studies with focus on prediction of human hamstring tendon-autograft size, -regeneration, -biology and -remodelling as well as the long-term clinical and radiographic outcome after ACL reconstruction. Hamstring tendon autograft length and diameter can be predicted in Caucasians. Length of the gracilis and semitendinosus tendons was independently related to patient height. Smaller graft diameter was related to female gender. Hamstring tendons regenerated after harvest of both semitendinosus and gracilis tendons for ACL reconstruction. Tendon regeneration was not associated with isokinetic flexion strength.

The in vivo human ACL graft biopsy study illustrated that human hamstring tendon grafts showed typical stages of graft remodelling, which was not complete up to 2 years after ACL reconstruction. The remodelling process in humans was prolonged compared with previous results in animal studies. While today's rehabilitation protocols are often extrapolated from findings of animal studies, current findings of human in vivo healing studies might require new postoperative regimens following hamstring tendon ACL reconstruction. Biological evidence does not support return to sport 4-6 months after ACL reconstruction.



The prospective long-term clinical and radiological results after hamstring tendon autograft ACL reconstruction with accelerated brace-free rehabilitation showed a significant improvement between preoperative and postoperative measurements for the Lysholm- and Tegner scores, IKDC-patient subjective assessment, KT-1000 measurements, pivot shift test, IKDC score and one-leg hop test. At 10-year follow-up, radiological signs of osteoarthritis were present in 53.5% of the subjects. Significant predictors for knee osteoarthritis were the status of the medial meniscus and ICRS grade 3-cartilage condition at the time of ACL reconstruction.

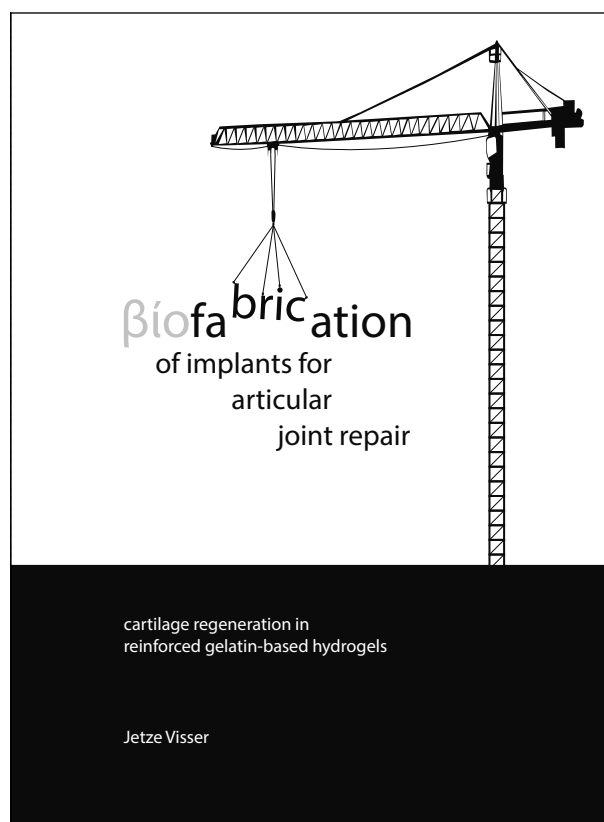
The discussion presents recommendations for improvement of current rehabilitation protocols. ACL graft healing can only progress if mechanical loading occurs: however, the most adequate magnitude at varying phases of healing is still not clarified. Accelerated rehabilitation needs to be as aggressive as possible in restoring function while still maintaining an optimal tissue-healing environment. The development of valid, criterion-based assessments to determine readiness for sport-specific training and eventual return to sports is greatly needed. Identifying specific patient phe-

notypes, possibly gender-related, may allow a more customized rehabilitation approach. Studies identifying sport-specific differences in ACL reconstruction outcomes in athletes could further enhance different time frames of rehabilitation programmes after ACL reconstruction. The striking similarities between tendinopathy models and ACL hamstring tendon graft remodelling inspired me to contemplate new horizons in ACL remodelling and rehabilitation research.

Future research will have to be directed to: (1) optimizing ACL reconstructions to fully restore the anatomy and function while providing the mechanical strength of the intact ACL; (2) developing biological treatment options that impact on graft healing especially during the early and proliferation phase to optimize extracellular matrix remodelling and avoid excessive remodelling activity that might impair mechanical integrity of the healing graft and; (3) to better differentiate the "good" from the "bad" remodelling changes, so that the time to return to sports without any restrictions can be reduced.

The full thesis is available at: <http://www.rpa-janssen.nl/thesis/>

Biofabrication of implants for articular joint repair cartilage regeneration in reinforced gelatin-based hydrogels. Jetze Visser, UMC Utrecht, 25 August 2015



Implants were biofabricated for the repair of chondral and osteochondral articular joint defects. The implants were based on gelatin methacrylamide (GelMA) hydrogels combined with printed fibers from a biodegradable thermoplastic polymer (polycaprolactone (PCL)) for mechanical reinforcement.

Part I shows that biological modification of GelMA by the addition of matrix derived from cartilage, meniscus or tendon tissue has a neutral or negative effect on cartilage matrix production by encapsulated Mesenchymal Stem Cells (MSCs) and chondrocytes, respectively. Furthermore, MSCs in GelMA in a subcutaneous rat model could not be locked in their chondrogenic state, considering the evident process of endochondral bone formation in these constructs. Both the quantity and quality of bone formed by MSCs in GelMA are nonetheless encouraging for bone tissue engineers.

In Part II, hydrogels were successfully reinforced with microfibers. These hydrogel/microfiber composites approached the stiffness and elasticity of articular cartilage and permitted the formation of cartilage matrix by embedded chondrocytes.

In Part III, reinforced GelMA was applied for the biofabrication of larger, osteochondral constructs.

Orthotopic animal models were established for evaluating the efficacy of reinforced GelMA for the repair of focal cartilage defects (in the knee joint of ponies) and for total joint replacement (in shoulder joint of rabbits). The preparation of the biofabricated implants was described, as well as the implantation and preliminary outcomes of both animal models.

Altogether, the work in this thesis resulted in implants for articular joint regeneration, consisting of gelatin-based hydrogels that were reinforced with 3D-printed fibers. The shape and content of

the implants could be tailored with biofabrication techniques, based on 3D-scans of the joint defect. Animal models were initiated to evaluate the repair capacities of the implants for a focal cartilage defect and for a complete joint. With tissue regeneration in reinforced hydrogels, larger articular joint defects in patients can potentially be repaired on a biological level.

The full thesis is available at: http://www.orthopeden.org/uploads/_U/wv/_Uwv93m36i022R0G4-BE0AA/Proefschrift-Jetze-Visser.pdf

Vol
23

sept
'16

Even binnenkijken

De dagelijkse zaken van de NOV en de LROI gebeuren vanuit het bureau in 's-Hertogenbosch. Hoe gaat het er daar aan toe, hoe ziet het eruit en wie werken er? We zetten de medewerkers en een aantal feiten op een rijtje.

Het bureau is sinds 2008 gehuisvest aan de Bruistensingel in 's-Hertogenbosch. Vlakbij de afrit Rosmalen (A2) staan een aantal kantoorpanden en in één van deze panden huurt de NOV een etage. Eind 2015 verhuisde het bureau naar een vernieuwde afdeling. Bij binnenkomst zie je meteen dat de vereniging een lange geschiedenis heeft; alle oud-voorzitters zijn geportretteerd op de achterwand van de kantoorruimte. Het bureau bestaat uit een centrale vergaderruimte en daar omheen zeven werkkamers; een moderne en lichte omgeving met veel glas. Sinds de verhuizing vergadert het NOV-bestuur maandelijks op deze afdeling, waardoor er meer contact is tussen het bestuur en de medewerkers.

Medewerkers NOV

Chris van der Togt is directeur van de NOV en de LROI en werkt er sinds 1998. Hij heeft bewegingswetenschappen als achtergrond en is min of meer het geheugen en de continue factor van de vereniging. Daar waar het bestuur regelmatig wisselt, zorgt Chris voor continuïteit. "Ik ben eigenlijk een facilitator, tussenpersoon of makelaar voor de vereniging en de bewaker van het strategisch plan. Ik stroomlijn de interne en externe organisatie. Hiervoor heb ik nauw contact met het NOV-bestuur en de stakeholders. Ik ben bijvoorbeeld altijd aanwezig bij de bestuursvergaderingen." *Odette de Beer* is stafmedewerker en werkt sinds 2008 bij de NOV. Daarvoor werkte zij als secretaresse in een revalidatiecentrum en bij een vakgroep orthopedie. Odette doet van alles; zij is onder andere ambtelijk secretaris van het Concilium, de Opleidingscommissie, de Commissie Kwaliteitsvisitatie (CKV), de Commissie Wetenschap en Innovatie en de Accreditatiecommissie. Daarnaast organiseert zij de CCOC en het algemeen examen orthopedie. Zelf omschrijft zij het als volgt: "Mijn hart ligt bij het organiseren, coördineren en regelen van allerlei zaken die de NOV aangaan."



Tot 1998 was er alleen secretariële ondersteuning voor het bestuur en in dat jaar kwam er een directeur bij voor twee uur per week. Het bureau groeide en werd in 2007 aangevuld met de LROI, ondergebracht in een separate stichting. Momenteel werken er bij de NOV en de LROI elf mensen.

Sonja Doetjes is directiesecretaresse en officemanager bij de NOV sinds 2014. Voorheen had zij vergelijkbare functies in de financiële sector. Sonja is druk achter de schermen; vooral met lopende zaken en allerlei regel- en logistieke werkzaamheden voor de NOV. "Een plek die goed bij mij past", zegt zij zelf; "ik werk liever achter de schermen dan ervoor." Wie belt met de NOV krijgt meestal Sonja aan de telefoon en ook veel mailcontacten lopen via haar. De afgelopen maanden was zij druk met het inrichten van een nieuw systeem voor het beheer van de leden en de netwerkcontacten.

Marleen Ploegmakers studeerde biomedische wetenschappen (Nijmegen) en zij is beleidsmedewerker kwaliteit. Vanuit een samenwerking met het Kennisinstituut van Medisch Specialisten werkt zij ongeveer een dag per week bij de NOV. Marleen ondersteunt de vereniging bij (de ontwikkeling van) het kwaliteitsbeleid. Zij is onder meer ambtelijk secretaris van de Commissie Kwaliteit. Onderwerpen waar zij zich mee bezighoudt zijn ontwikkeling PROMs, ontwikkeling richtlijnen, indicatorenbesprekingen etc.



Achter vlnr: Odette, Nicole, Sonja, Chris, Angelique, Edith. Voor vlnr: Marleen, Geke, Anneke, Marloes, Liza.

Angelique de Gruijter werkt sinds 2010 bij de NOV als financieel medewerker. Zij verzorgt alle financiële zaken, zoals bijvoorbeeld de ledenadministratie, facturering, financiële rapportage etc. De NOV heeft een nieuw systeem aangeschaft voor het beheer van het ledenbestand en de financiën. De afgelopen tijd heeft Angelique zich beziggehouden met de inrichting daarvan. Eén van de eerste resultaten hiervan was dat u de factuur voor uw lidmaatschap van 2016 digitaal kreeg toegestuurd.

Marloes Schmitz is per september gestart bij de NOV. Zij studeerde geneeskunde en was drie jaar AIOS-orthopedie; een mooie achtergrond om de nieuwe functie van research-coördinator op te pakken. Marloes zal invulling geven aan een wetenschappelijk orthopedisch jaarplan en deze afstemmen met de activiteiten van de LROI. Daarnaast coördineert zij de onderzoeksprojecten binnen CORE en zij zal ondersteunen en begeleiden bij de subsidieaanvragen vanuit de NOV. In 2017 hoopt Marloes te promoveren op het onderwerp *Primaire heupchirurgie bij de jonge patiënt*.

Edith Rijnsburger verzorgt de communicatie en voorlichting en startte in april 2016 bij de NOV. Zij werkte jaren als kindersfiotherapeut, volgde de opleiding communicatie en was communicatieadviseur in een revalidatiecentrum. Momenteel werkt zij een plan uit om de interne en externe communicatie van de NOV en de LROI efficiënter uit te voeren. Daar horen onder andere nieuwe websites bij.

Medewerkers LROI

Geke Denissen is manager van de LROI sinds 2012. Zij studeerde biomedische wetenschappen (Nijmegen). Geke zorgt ervoor dat de LROI-projecten van de grond komen en dat de LROI extern wordt neer-

gezet, bijvoorbeeld op congressen en symposia. Zij heeft vanuit de LROI contact met stakeholders, zoals de zorgverzekeraars en de industrie. Momenteel is zij druk doende om de overgang naar Reports voor te bereiden, zodat dit straks soepel verloopt. Al met al gaat daar veel tijd in zitten: "Wij moeten Reports van binnen en van buiten kennen, ons er volledig in verdiepen en bijvoorbeeld ook het scannen van alle barcodes testen. Een intensief traject, maar ik verheug me op de transitie."

Liza van Steenberg is klinisch epidemioloog en werkt

sinds 2013 bij de LROI. Zij is gepromoveerd aan de Erasmus Universiteit waar zij onderzoek deed naar de kwaliteit van zorg voor patiënten met dikke darmkanker. Zij maakte hiervoor gebruik van de Eindhovense en Nederlandse Kankerregistratie.

Liza is verantwoordelijk voor het wetenschappelijk deel van de LROI: opzetten, vormgeven en uitvoeren. Zij doet onderzoek met de LROI-database, in samenwerking met externe onderzoekers en naar aanleiding van vragen uit het veld. Zij werkte daarnaast mee aan het opzetten van het Van Rens Fonds, een fonds dat meer onderzoek met LROI-data mogelijk maakt.

Anneke Spekenbrink werkt sinds 2013 als onderzoeker bij de LROI. Zij rondde de opleiding HBO-Verpleegkunde af en studeerde daarna gezondheidswetenschappen. Anneke houdt zich bezig met de datakwaliteit; de volledigheid en compleetheid van de LROI-registratie. Hiervoor heeft zij bijvoorbeeld veel ziekenhuisbezoeken afgelegd. Momenteel doet zij een studie naar de korte termijn overleving van de cruciate retaining totale knieprothese ten opzichte van de posterior stabili-zed totale knieprothese. Daarnaast schrijft zij mee aan de jaarrapportage.

Nicole Stokman verzorgt sinds mei 2015 de secretariële ondersteuning van de LROI. Zij volgde een opleiding in het toerisme en werkte vervolgens als managementassistent en office manager, onder andere bij tandartsen en tandtechnici. Als u telefonisch contact opneemt met de LROI, krijgt u Nicole meestal aan de telefoon. LROI-zaken die via haar verlopen zijn bijvoorbeeld aanvragen, wijzigingen en controles van accounts, mailings, beheer van de website etc. Heeft u een vraag of suggestie, of wilt u sparren met een medewerker? Neem hiervoor gerust contact op via nov@orthopeden.org of 073-7003410!

Start bouw vernieuwd LROI-dashboard

In voorgaande edities van dit tijdschrift informeerden wij u over de migratie van de LROI-database naar een nieuw softwaresysteem. We nemen afscheid van het vertrouwde ProMISe en brengen de LROI-registratie onder bij een andere partij; Reports. De afgelopen tijd is de database ingericht, de barcodescanning opgezet en het nieuwe dashboard ontwikkeld.

De LROI-migratie bestaat uit drie fasen. Fase I is inmiddels afgerond en bestond uit het ontwikkelen van de PROMs-webforms. Inmiddels maken 22 ziekenhuizen gebruik van deze vernieuwde formulieren. Fase II bestaat uit de verdere ontwikkeling van de LROI-database en fase III is gereserveerd voor de optimalisatie van de database, na de implementatie.



De LROI-migratie bestaat uit drie verschillende fasen.

Vernieuwd dashboard

Het nieuwe LROI-dashboard is gebouwd in een andere omgeving; SAS Visual Analytics. Deze is zeer geschikt om de analyses visueel, mooi en duidelijk weer te geven; van beschrijvende tabellen tot overlevingscurves. Een ander voordeel van de SAS Visual Analytics omgeving is dat we het maken van een nieuw rapport straks meer in eigen hand

hebben. Momenteel houden we ons bezig met de vormgeving van het dashboard. Voordelen voor u zijn onder andere:

- Bij enkele rapporten kunt u gemakkelijk een patiënttabel oproepen. Zo ziet u snel welke patiënten geregistreerd zijn en of zij bij bepaalde eigenschappen passen.
- Voor elke analyse en uitkomst is een mooi visueel rapport beschikbaar.
- Het dashboard wordt ingericht naast het invoerportaal zodat u snel uw resultaten terugziet.

Voortgang

We hopen de nieuwe LROI in oktober 2016 te implementeren in uw ziekenhuis. De data die al zijn ingevoerd worden in een keer overgeplaatst naar het nieuwe systeem. De LROI zal dan waarschijnlijk enkele dagen gesloten zijn.

Na de overgang starten wij met fase III, het optimaliseren van de nieuwe database. Zaken die opvallen, of nog niet vlekkeloos verlopen zullen we dan oppakken. Uiteraard staan wij open voor uw op- en aanmerkingen, zodat wij dit mee kunnen nemen in de doorontwikkeling.

Heeft u nu al vragen, ideeën, op- of aanmerkingen, dan horen wij dat natuurlijk ook graag. U kunt contact met ons opnemen via lroi@orthopeden.org.

Geke Denissen, manager

Jubileum LROI

In 2017 bestaat de Landelijke Registratie Orthopedische Implantaten 10 jaar en dat gaan we uitgebreid vieren. Hiervoor is een speciaal LROI-comité opgericht, met een afvaardiging uit het LROI-bestuur, de Wetenschappelijke Adviesraad (WAR), het orthopedisch werkveld en enkele LROI medewerkers.

Congressen

Op de eerste dag van het NOV-Jaarcongres 2017 (1 februari) wijden we een extra congresdag aan de LROI. Die dag geven gastsprekers invulling aan een programma over de intrinsieke waarde van de LROI. De overige dagen van het jaarcongres staan in het teken van registers en ook daar zal de LROI meerdere malen aan bod komen.

Tijdens de Voorjaarsvergadering op 12 mei 2017 zal het middagprogramma opnieuw in het teken staan



van de LROI. Deze middag organiseren we voor de stakeholders van de LROI - zoals IGZ, ministerie van Volksgezondheid, zorgverzekeraars, patiënten en industrie - én de NOV-leden. We besteden dan aandacht aan de externe verantwoording en de profilering van de LROI.

Overige

Tot slot zal de LROI-rapportage van 2017 in het teken staan van 10 jaar LROI en er komt een speciaal themanummer van het NTvO met aandacht voor het jubileumjaar. Het belooft een mooi jaar te worden!

Geke Denissen, manager

Z-cards en posters

De LROI heeft Z-cards en posters ontwikkeld. Mooi materiaal om uw patiënten te informeren over prothesen en het belang van de registratie van orthopedische implantaten. De Z-card over de knie- en heupprothese is nog op voorraad, evenals de posters heup, knie, enkel, schouder en elleboog. U kunt deze bestellen via de website van

de LROI (lroi.nl/publicaties/informatie&voorlichting). Maak er gebruik van! De Z-cards van de enkel, elleboog en schouder zijn helaas niet meer voorradig.



Congressen NOV

Najaarsvergadering

Het is kort dag, maar voor de najaarsvergadering in Veldhoven op donderdag 13 en vrijdag 14 oktober kunt u zich nog t/m 5 oktober inschrijven via de website (orthopeden.org/congressen), of bij de

informatiebalie tijdens de congresdagen. De Commissie Wetenschap & Innovatie heeft een mooi programma samengesteld, dit keer in samenwerking met het Consortium CORE, Anna Fonds I NOREF en de werkgroepen NVOT, Voet en Enkel, NOTS en PA-VS:

Vol
23

sept
'16

Programma donderdag 13 oktober

08.30 uur	Ontvangst
09.00 uur	Parallelsessie Werkgroep NOTS en Werkgroep PA-VS (zie NOV-website)
10.28 uur	Pauze
11.00	Abstracts (zie NOV-website)
12.30 uur	Pauze
13.30 uur	Abstracts (zie NOV-website)
14.47 uur	Pauze
15.15 uur	Abstracts (zie NOV-website)
16.32 uur	Pauze
16.50 uur	Uitreiking NOV Zorg voor beweging Mediaprijs 2016
17.00 uur	348e Algemene Ledenvergadering
18.30 uur	Borrel
19.00 uur	Avondprogramma

Programma vrijdag 14 oktober

09.00 uur	Ontvangst
09.30 uur	Parallelsessie Werkgroep Voet en Enkel en Consortium CORE (zie NOV-website)
11.00 uur	Pauze
11.30 uur	Anna Fonds I NOREF (zie NOV-website)
12.30 uur	Lunchpauze
13.30 uur	Werkgroep NVOT (zie NOV-website)
15.00 uur	Sluiting

Jaarcongres 2017

Op 1, 2 en 3 februari vindt het NOV-Jaarcongres 2017 plaats in de Brabanthallen in 's-Hertogenbosch. Het thema is *(Kwaliteit) Registers*. Op alle dagen is er een gevarieerd en interessant (wetenschappelijke) programma van de Commissie Wetenschap & Innovatie, in samenwerking met verschillende werkgroepen. De call for abstracts is inmiddels gesloten en de abstracts staan binnenkort op de website.

Highlights

De eerste dag (1 februari) staat volledig in het teken van de LROI. We hopen u te laten zien hoe de vakgroepen orthopedie de gegevens van de LROI gebruiken om de kwaliteit te verbeteren. 's Avonds vindt het seniorendiner plaats.

Op 2 februari staan - naast het wetenschappelijke programma - onder andere de uitreiking van de Rik Huiskesprijs, de algemene ledenvergadering en de NOV-dag voor secretaresses en polikliniek-

assistenten op het programma. Op 3 februari vinden de Murk Janssen lezing en de uitreiking van de van RensPrijs plaats. Uiteraard zijn er feestelijke

avondprogramma's! Informatie over de programmering en de inschrijving staat op de NOV-website (orthopeden.org/congressen).

Deadline bestellen Jaarmagazine 2017



Via Noviteiten heeft u al een aantal keer bericht ontvangen over de procedure voor het bestellen van het *Zorg voor beweging Jaarmagazine 2017*. U kunt het Jaarmagazine nu ook voorzien van een vakgroep-eigen

voorpagina. De deadline voor uw bestelling nadert: dit kan tot 10 oktober! Nabestellingen zijn mogelijk, maar relatief duur. Alle informatie over het bestellen staat op de NOV-website (orthopeden.org/patiënteninformatie/campagne-info). Heeft u vragen? Neem dan contact op met het NOV-bureau via nov@orthopeden.org of 073-7003410.

Vol
23

sept
'16

Matchmaker Orthopedie

Het NOV-bestuur en de VOCA hebben de afgelopen maanden verschillende initiatieven genomen om de dreigende problematiek rondom de werkgelegenheid voor Jonge Klaren het hoofd te bieden. De NOV gaat daarnaast ook nog ondersteuning bieden bij het zoeken naar een baan en is hiervoor gestart met de *Matchmaker Orthopedie*, in samenwerking met de VOCA. Het doel is om vraag en aanbod bij elkaar te brengen en een scherpe match te maken tussen de vakgroepen orthopedie en Jonge Klaren. Alle geïnteresseerde AIOS orthopedie en Jonge Kla-

ren orthopedie zijn inmiddels uitgenodigd om zich aan te melden en hun gegevens en wensen bekend te maken aan de NOV. Met dit bestand kan de NOV een passende match maken als er een vraag is van een vakgroep orthopedie. De AIOS en Jonge Klaren zijn zelf verantwoordelijk voor het up-to-date houden van de gegevens. Uiteraard worden deze vertrouwelijk beschikbaar gesteld aan de vakgroepen. Heeft u vragen, wensen of zoekt u een nieuwe collega? Neem dan contact op met het NOV-bureau via nov@orthopeden.org of 073-7003410.

Dankdiner op grote hoogte

Op 5 november vindt het dankdiner plaats. Een diner waarmee het NOV-bestuur onder andere haar ereleden, commissieleden, voorzitters en secretarissen van de NOV-werkgroepen bedankt voor hun inzet en betrokkenheid. Dit jaar dineren zij in de Euromast, zodat de tienduizenden lichtjes van Rotterdam het decor zullen zijn van het diner.

Voor uw agenda

13 en 14 oktober	Najaarsvergadering
3 en 4 november	Werkgroep NVOT traumadagen
5 november	Dankdiner
12 november	VOCA congres
18 november	CCOC kinderorthopedie en traumatologie
13 januari	CCOC oncologie
1, 2 en 3 februari	Jaarcongres

Meer informatie hierover op de website van de NOV (orthopeden.org/vereniging/agenda).



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- 98% Survivorship at 8 - 13 year follow-up in 91 patients, 50 years old or younger⁴

Allofit Acetabular System

- 97.5% Survivorship at 9 - 12 years follow-up in 81 patients with revision of the component as the endpoint⁵
- 98% Survivorship at 3 - 7 years follow-up of 154 patients with revision of the component as the endpoint⁶

References

1. Latest ODEP ratings can be found at www.odep.org.uk
2. Latest NOV ratings can be found at www.orthopeden.org
3. McLaughlin, J.R. et Al. Survivorship at 22 to 26 Years Reported with Uncemented Tapered Total Hip Stem. *Orthopedics Today*. 30(1): 1, 2010.
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5. Zenz, P. et Al. 10 Years of Results After Implantation of the Cementless Pressfit Cup "Allofit". *The Journal of Bone and Joint Surgery*. 91-B:1443-7, 2009.
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