Results of Peri-Articular Steroid Injection in the Treatment of Chronic Extra-Articular Pain after Total Knee Arthroplasty

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Objective: *The authors conducted study to analyze results of peri-articular steroid injection in the treatment of chronic pain from soft tissue inflammation after total knee arthroplasty (TKA).*

Material and Method: *The authors retrieved data from all patients underwent TKA whom suffered with chronic extra-articular pain and received local peri-articular steroid injection by 2 senior authors during January 1, 2008 to June 30, 2010. Clinical evaluation such as pain score, knee score and functional score were recorded pre-injection and three months after injection.*

Results: *554 TKA cases were operated during January 1, 2008 and June 30, 2010. 29 knees from 28 female patients were injected with steroid injection and included in the present study. Mean age of 64.7 year and mean BMI of 27.7. Three patients in this group were diagnoses as Diabetes. The most common site of injection was in Tibia, with either Anserinus bursa or around Gerdy's tubercle. Mean time to injection after operation was 5 months. Mean VAS was reduced from 56.5 $\pm$ 20.32 to 20.57 $\pm$ 16.1. Mean knee score and functional score were improved from 74.62 $\pm$ 14.24 to 85.71 $\pm$ 11.85 and from 53.4 $\pm$ 22.57 to 67.04 $\pm$ 21.17 consecutively. All clinical difference has statistically significant with p-value < 0.05. There was no incident of superficial or deep infection at mean follow-up time of 2 years and 5 months.*

Conclusion: *Local steroid injection is a safe and effective choice for treatment of pain from chronic soft tissue inflammation after TKA.*

Keywords: *Steroid injection, Chronic pain, Total knee arthroplasty*

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Total knee arthroplasty (TKA) is one of the most successful orthopedics operations in term of implant longevity[1,2]. Despite of that, there were still considerable numbers of patients suffered with chronic pain after operation[3,4]. Normally patients would experience moderate pain in the early post-operative period and subsides to mild pain within 3 months after operation. But some patients suffered with ongoing pain for longer period, or some cases pain may occur lately after a long period of pain-free interval. Pain after total knee arthroplasty may causes from various results such as infection, component loosening, rotational malalignment[5], patellar related problems[6], bursitis or tendinitis, complex regional pain syndrome (CRPS)[7] and more. The causes of chronic pain excluding infection may categorize into 1) mechanical or prosthesis-related, 2) CRPS and 3) chronic soft tissue inflammation. Normally if the symptoms causes by mechanical or prosthetic related, the treatment should be surgical intervention. Surgical intervention may be varied depends on the source of pain such as arthroscopic debridement in case of patella clunk syndrome or prosthetic revision in case of implant loosening, malposition or instability was detected. And if the cause of pain due to CRPS with allodynia, disproportion high pain level and abnormal vasomotor changes, then the patient should be treated specifically by multimodal pain management for CRPS. Finally in the last group of chronic soft tissue inflammation, which may causes from soft tissue irritation or chronic inflammatory process, the treatment should consisted of non-steroidal anti-inflammatory drugs, analgesics and physical modalities. But even with multi-medications and physical therapy, the pain was still

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troublesome in some cases.

Corticosteroids were reported to be an effective agent to reduce post-operative pain via reduction of inflammatory response and inhibit pain transmission at peripheral level on nociceptive fiber[8,9]. However, there were concerns about adverse local effect and systemic effects especially possibility of increase infection rate and impair wound healing. Nevertheless, there were reports about local steroid injection and post-operative pain control in foot surgery[10], neurosurgery[11] and rhinoplasty[12]. More recently in arthroplasty, it was used in combination with variety of drugs such as NSAIDs and local anesthetics agents in intra-operative peri-articular injection solution for the purpose of reduces post-operative pain and inflammation[13]. But there was no report about using steroid injection in chronic knee pain after TKA. Two senior authors (SM and PC) used steroid injection to manage this problem since early 2008; therefore the authors conducted the present study to evaluate results of steroid injection for the treatment of chronic pain from soft tissue irritation or inflammation in our hospital.

Objective

To analyze the results of peri-articular steroid injection in the treatment of chronic knee pain from soft tissue irritation or inflammation after total knee arthroplasty in Vajira Hospital.

Material and Method

The authors' retrieved data from all patients underwent TKA by 2 senior authors from January 1, 2008 to June 30, 2010. General data such as age, sex, underlying disease especially Diabetes, BMI, Prosthesis type were recorded. Patients whom suffered with moderate to severe knee pain from chronic soft tissue irritation or inflammation more than six weeks despite full conservative treatment and received local steroid injection for the treatment of pain were included for the present study. Full conservative treatment included using of multiple drugs such as NSAIDs, analgesics including Tramadal, Gabapentin and physical modalities. The authors excluded patients with surgically correctable causes from prosthesis or mechanical related problems such as component loosening or instability, patella clunk, instability or painful crepitation. Patients with proven evidence of joint infection, infection of adjacent area or CRPS were also excluded. After the location of pain in each patient was identified, the authors injected peri-articular steroid injection consisted of Triamcinolone Acetonide 10 mg/ml 1 cc plus 2% xylocaine with adrenalin 3 cc at the tender point under sterile technique. Clinical evaluation such as pain score evaluation using visual analog scale (VAS), knee score and functional score were recorded pre-injection and three months after injection. All patients were appointed to follow-up at 3 months period afterward for detection of complications that might occur in long term. The authors also record patient preference scale to evaluate overall results of the injection. Complications after injection such as superficial or deep infection, soft tissue atrophy and discoloration were also recorded. Paired t-test was used for statistical analysis and p-value less than 0.05 was considered as statistical significant.

Results

Out of 554 TKA cases operated during January 1, 2008 and June 30, 2010, 29 knees were injected with steroid injection and were included in the present study. There were 28 patients, all patients are female patients with mean age of 64.7 year and mean BMI of 27.7. Three patients in this group were diagnoses as Diabetes; they were well control with oral hypoglycemic drugs. Mean time to injection after operation was 5 months and mean follow-up time was 2 years and 5 months. The most common site of injection was in Tibia, with either Anserinus bursa or around Gerdy's tubercle. At three month after injection, pain evaluation in term of mean VAS was reduced from 56.5 ± 20.32 to 20.57 ± 16.1, mean knee score was improved from 74.62 ± 14.24 to 85.71 ± 11.85 and mean functional score was also improved from 53.4 ± 22.57 to 67.04 ± 21.17. All clinical difference has statistically significant with p-value < 0.05. Regarding patient satisfaction, median of preference of all patients was 4 out of 5 (80% satisfaction). There were 2 knees reported transient skin discoloration, which resolved after 1 year. There was no incident of infection, hematoma, soft tissue atrophy, or nerve injury in the present study. Demographic data were summarized in Table 1. Pain score reduction, knee score and functional score improvement were showed in Fig. 1.

Discussion

Total knee arthroplasty is one of the most common elective orthopedic operations in our hospital. Although the general results are excellent, there are patients suffered with chronic pain after surgery. Some of them causes by soft tissue irritation or inflammation, which the authors usually treated these patients by

Table 1. Summary of demographic data

Number of knee, Number of patients	29 knees, 28 patients
Patients with DM	3 knees, 3 patients
Age	64.7 $\pm$ 7.7
Gender	All female
BMI	27.7 $\pm$ 4.8
Surgical side:Left/Right	15: 14
Bearing type:Fixed/Mobile (% of cases)	17:12 (4.2%:8.3%)
Injection site in fixed bearing:Medial/Lateral	8:9
Injection site in mobile bearing:Medial/Lateral	3:9

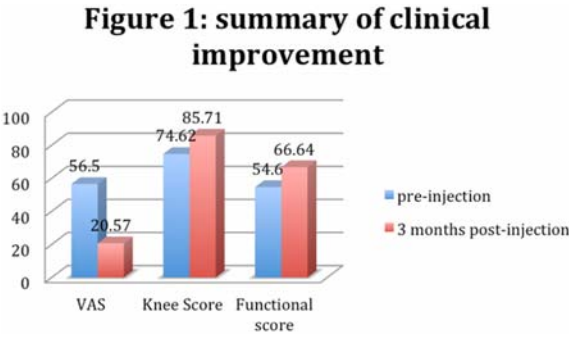

Fig. 1 Summary of clinical improvement

using oral analgesics, NSAIDs and physical modalities. However, there was certain number whom failed to respond after treatment with this regimen. In the pastime, most of these patients lived with ongoing pain, which may or may not resolved over time and most of them needed long-term analgesic to suppress the symptoms. From the authors' data, the authors found 5.2% (29 out of 554 knees) of the presented patients were categorized into this group and were treated with steroid injection. Demographically these patients are typical TKA patients; all of them are female with relatively high BMI of 27.7. There was no left-right preference in the present data but the authors found relatively higher incident in mobile bearing knee prosthesis. This condition may causes from higher strain force transfer through soft tissue envelope in mobile bearing knee and soft tissue irritation from mobility of mobile bearing itself. And this may explain different pattern of pain location found between bearing type, which pain over lateral proximal tibia around Gerdy's tubercle was more common in mobile bearing group. Chronic inflammation over Gerdy's tubercle, which may reflect irritation of insertion of Iliotibial band, is not common in non-TKA patients but from the authors data there were about 50% of steroid injection group need injection over this area. Anserine bursitis is a common cause of knee pain in patient with osteoarthritis of the knee[14]. Steroid injection is an effective treatment for Anserine bursitis in non-TKA patients[14,15] and also data from the present study showed the same results in the authors TKA patient with Anserine bursitis.

Local corticosteroids injection in orthopedics was reported in various specialty such as arthroscopic surgery[16], foot and ankle surgery[10] and arthroplasty[13,17]. But the main purpose of injection is to reduce immediate post-operative pain, which is different from the present study. The authprs use steroid injection in the scenario of chronic pain from irritation or inflammation after TKA. The authors start to use steroid injection for treatment in this group of patients since 2008 and closely observed these patients for more than 2 years. All patients responded to injection as showed by statistically significant reduction of pain score, statistically significant improvement of knee score and functional score. And finally all patients preferred to choose this treatment again if they had recurrent symptoms. Since there was no incident of infection or other serious complication reported in the present study after follows-up more than 2 years even in DM cases, the authors believe that steroid injection is a safe method for treatment of chronic pain from soft tissue irritation or inflammation after TKA.

Conclusion

Chronic pain from soft tissue irritation or inflammation after TKA is not uncommon. The location of pain after TKA may be different from location of pain in OA knee, especially in mobile bearing TKA, which pain on lateral side of proximal tibia is more common. Treatment with peri-articular steroid injection in selected cases is a safe and effective method.

Potential conflicts of interest

None.

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ผลการรักษาภาวะความเจ็บปวดเรื้อรังเนื่องจากมีการระคายเคืองของเนื้อเยื่ออ่อนหรือเนื้อเยื่ออ่อนอักเสบที่เกิดขึ้นภายหลังการผ่าตัดเปลี่ยนข้อเข่าเทียมด้วยการใช้สเตียรอยด์ฉีดเฉพาะที่

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วัตถุประสงค์: วิเคราะห์ผลการรักษาภาวะความเจ็บปวดเรื้อรังเนื่องจากมีการระคายเคืองของเนื้อเยื่ออ่อนหรือเนื้อเยื่ออ่อนอักเสบที่เกิดขึ้นภายหลังการผ่าตัดเปลี่ยนข้อเข่าเทียมด้วยการใช้สเตียรอยด์ฉีดเฉพาะที่

วัสดุและวิธีการ: เก็บข้อมูลจากผู้ป่วยผ่าตัดเปลี่ยนข้อเข่าเทียมระหว่าง 1 มกราคม พ.ศ. 2551 ถึง 30 มิถุนายน พ.ศ. 2553 และมีภาวะความเจ็บปวดเรื้อรังเนื่องจากมีการระคายเคืองของเนื้อเยื่ออ่อนหรือเนื้อเยื่ออ่อนอักเสบที่เกิดขึ้นภายหลังการผ่าตัด เปลี่ยนข้อเข่าเทียมโดยที่ผู้นิพนธ์ได้ทำการรักษาด้วยการใช้สเตียรอยด์ฉีดเข้าไปที่บริเวณเนื้อเยื่ออ่อนดังกล่าว

ผลการศึกษา: ในระยะเวลาดังกล่าวพบว่ามีผู้ป่วยได้รับการผ่าตัดเปลี่ยนข้อเข่าเทียมจำนวน 554 ข้อเข่าและมีผู้ป่วยที่มีภาวะความเจ็บปวดเรื้อรังจำนวน 28 คน (29 ข้อเข่า) ที่ได้รับการรักษาด้วยการฉีดสเตียรอยด์เฉพาะที่ อายุเฉลี่ย 64.7 ปี และมีค่าดัชนีมวลกายเฉลี่ย 27.7 โดยมีผู้ป่วย 3 คน เป็นโรคเบาหวาน ตำแหน่งที่ฉีดยาที่พบบ่อยคือ Anserinus bursa และ Gerdy's tubercle ผลการรักษาพบว่าระดับความเจ็บปวด (Mean VAS) ลดลงจาก 56.5 $\pm$ 20.32 เหลือ 20.57 $\pm$ 16.1 ค่าเฉลี่ยของ knee score สูงขึ้นจาก 74.62 $\pm$ 14.24 เป็น 85.71 $\pm$ 11.85 และค่าเฉลี่ยของ functional score สูงขึ้นจาก 53.4 $\pm$ 67.04 $\pm$ 21.17 โดยค่าการเปลี่ยนแปลงทั้งหมดมีนัยสำคัญทางสถิติ (p-value $<$ 0.05) และในการติดตามผู้ป่วยที่ระยะเวลาเฉลี่ย 2 ปี 5 เดือน ไม่พบมีการติดเชื้อของข้อเข่าเทียมหรือเนื้อเยื่ออ่อนบริเวณที่ฉีดสเตียรอยด์แต่อย่างใด

สรุป: การใช้สเตียรอยด์ฉีดเฉพาะที่เพื่อรักษาภาวะความเจ็บปวดเรื้อรัง เนื่องจากมีการระคายเคืองของเนื้อเยื่ออ่อนหรือเนื้อเยื่ออ่อนอักเสบที่เกิดขึ้นภายหลังการผ่าตัดเปลี่ยนข้อเข่าเทียม เป็นการรักษาที่ได้ผลดีและปลอดภัย มีผลข้างเคียงน้อย