

Neurovascular Complications in Forty-Nine Cases Elbow Arthroscopy and Review Literatures

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Background: An elbow arthroscopic surgery is a minimally invasive surgery. There were several international publications report neurovascular complications in elbow arthroscopic surgery. But there was no study which was conducted in Thailand.

Objective: To report the result of elbow arthroscopic surgery which focus on the neurovascular complications.

Material and Method: A retrospective review of elbow arthroscopic surgery between April 2011 to May 2014 at HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University in Nakhon Nayok province was performed. The data of complications were collected since immediately after surgery until 6 weeks after procedure.

Results: Forty-nine elbow arthroscopic surgeries were performed in 44 patients. The authors found total complications occurred in 2 cases (4%) which were minor complications. One case was transient cutaneous nerve injury (2%) and another case was cellulitis around a portal site (2%). No serious or permanent complication was detected.

Conclusion: Elbow arthroscopic surgery is considered a safe operation, because only one minor neurological complication was observed and no major neurovascular complications were detected.

Keywords: Elbow arthroscopy, Complications

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Elbow arthroscopic surgery has been used over the past 20 years for both diagnosis and treatment elbow disorders. It has been widely accepted as the newer operative techniques and performed worldwide. The indications for an elbow arthroscopic surgery include pathologic plica, septic arthritis, loose body, osteoarthritis of the elbow, tennis elbow etc⁽¹⁾. The benefits of elbow arthroscopic surgery include intra-articular pathology identification and the minimally invasive surgery⁽²⁾. Nevertheless, the complications in elbow arthroscopy are still the concern due to the close of major neurovascular structures. The complications of elbow arthroscopic surgery are higher compared to arthroscopy in other joints⁽³⁻⁵⁾. Mostly, the concern are neurovascular complications such as nerve damage, both temporarily and permanently⁽⁶⁻⁸⁾, compartment syndrome, and vascular injury⁽³⁾. All these complications have been reported in the international studies but neither report in Thailand nor in South East Asia, hence, this study has been developed.

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Material and Method

The authors collected data from the patients who were performed elbow arthroscopic surgery by single orthopedic surgeons at HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University in Nakhon Nayok province between April 2011 to May 2014. We aimed to investigate the complications of elbow arthroscopic surgery especially neurovascular complications.

The complications of elbow arthroscopic surgery that were investigated could be classified as major complications such as permanent nerve damage, elbow joint infection, compartment syndrome and vascular damage. Minor complications included temporary nerve damage, superficial skin infection that can control with oral antibiotic.

Nerve injuries were defined as numbness area along nerve distribution on skin by patient and confirm with pinprick or fine touch methods. The motor weakness was test along the innervation of the motor branch of the anterior interosseous nerve, posterior interosseous nerve, median nerve and ulnar nerve.

The data collection was done since immediately after the surgery until 6 weeks postoperative follow up. All patients had appointments at least six weeks after the surgery depending on the

problem, diagnosis and patient conditions. The final report of the complications of elbow arthroscopic surgeries was done at the 6th week following the surgery.

Surgical technique

The surgeon performed the operation under general anesthesia with no regional block or combined regional pain control. Because the status of nerve function can be evaluated immediately after the operation. The patient was placed in lateral decubitus position. The affected arm was laid on arm support and let the forearm was moved freely for full flexion and extension. The surgeon applied pneumatic tourniquet at the arm as proximal as possible. The surgeon did not use fluid injection to distend elbow joint for arthroscopic surgery.

The arthroscopic procedure started at anterior portal if the main pathology stayed in anterior compartment such as tennis elbow or started at posterior portal if the main pathology stayed in posterior compartment such as posteromedial bony impingement. The portals that the surgeon used for anterior compartment of the elbow were proximal antero-medial portal (starting portal) followed with antero-lateral portal by outside-in technique. The proximal antero-medial portal was used for the arthroscopic instruments and the proximal antero-lateral portal was created for place the retractor (Fig. 1).

In the posterior compartment of the elbow, the surgeon started with postero-lateral or direct posterior portal for the arthroscope and instruments that the surgeon could switch them each other. The surgeon used the direct lateral or soft spot portal in the case that needed the instruments for working in the lateral gutter (e.g. posterolateral plica etc.) (Fig. 2). Radiofrequency cautery (Turbovac, Arthrocare) was used routinely with the aggressive style shaver diameter 3.5 mm (Linvatec: ergo). The plier was used as a soft tissue retractor to increase the space and to push the nerve away from the shaver or radiofrequency cautery.

Results

Forty-nine elbow arthroscopic surgeries were performed in 44 patients. All the 49 elbow surgeries were performed by a single surgeon. The mean ages of patients were 42 (14-72) years old (Table 1).

The definite diagnosis after elbow arthroscopy was performed as: tennis elbow 9 cases (18%), plica 10 cases (21%), osteoarthritis 4 cases (8%), combine tennis elbow and plica 6 cases (12%), septic arthritis 2 cases (4%), trauma 4 cases (8%) and miscella-



PAM = proximal antero-medial portal; PAL = proximal antero-lateral portal

Fig. 1 Skin landmark portals for anterior compartment of elbow.



PT = posterior portal; PL = posterolateral portal; dL = direct portal or soft spot portal

Fig. 2 Skin landmark portals for posterior compartment of elbow.

neous 14 cases (29%) (Fig. 3).

Procedures in elbow arthroscopy were

osteo capsular arthroplasty in OA elbow, remove loose body, capsulectomy in case of stiffness, synovectomy in synovitis, debridement and shaving in plica and tennis elbow group, microfracture or chondroplasty in cartilage lesion, assisted or monitor intra-articular fracture in trauma cases.

Combined operation with elbow arthroscopy were lateral ulnar collateral ligament reconstruction with palmaris longus tendon graft, fixation with plate and screws in distal humerus, reparation of partial bicep insertion rupture, open mosaicplasty (osteochondral autografting) and mini decompression of ulnar nerve.

In the 49 surgeries, the authors found complications in 2 patients (4.1%). The complications were temporary nerve injury in one patient (2%) that experienced numbness in lateral side of elbow and forearm (lateral cutaneous nerve of forearm injury) following surgery and skin portal incision site infection

in one patient (2%) that could control with the short course of oral antibiotic. Both of them were in the group of patients that were diagnosed plica or tennis elbow and were performed arthroscopic debridement. The patient who developed the numbness took around six weeks to recover. The other types of complications were not found in present study.

Discussion

There have been studies on the complications of elbow arthroscopic surgery which reported incidences and types of complication. Kelly EW found that there were 11% of his patients developing minor complications and 2% for nerve damage⁽³⁾. Elfeddali R reported that there were 7% of the patients developing minor complications from elbow arthroscopic surgery⁽⁹⁾. Also, in Savoie's study, from his experience, the number of patients who developed complications following surgery was 9%⁽⁴⁾. These studies reported fairly similar results.

In present study, there were 2 cases that developed minor complications and there was no major complication. In terms of percentage, out of 49 cases, it is 4% which is similar to previous studies in European and American series. Both of them were minor complications and were treated by simple protocol.

There was no serious complication in present study because the surgeon performed the operation based on the basic of the elbow arthroscopic steps⁽¹⁾. The surgeon did the basic steps technique that was

Table 1. Demographic data of patients

Topic	Number
Total patient	44
Female	27 (61%)
Male	17 (39%)
Mean age (years)	42 (14-72)
Total elbow	49
Right elbow	24 (48%)
Left elbow	25 (52%)

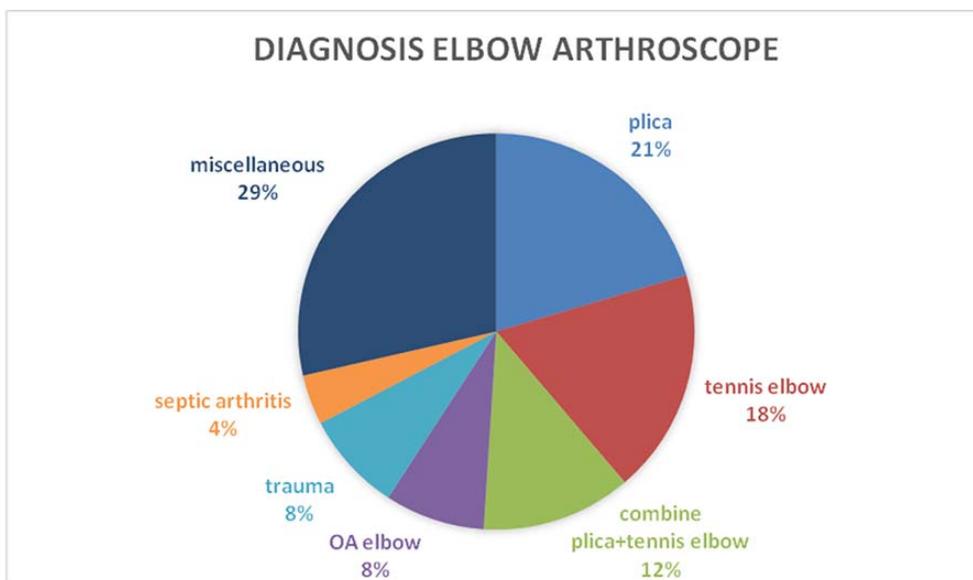


Fig. 3 Definite diagnosis after elbow arthroscopic surgery.

described by O'Driscoll⁽²⁾. First step is identify yourself where you are then the space around is created or increased that can be debride the soft tissue or shave the bone. The next step are bony procedures as cheilectomy, loose body removal then follow by the soft tissue procedures such as synovectomy or capsulectomy.

The order for portal insertion is not important. In our series, the decision which portal should be first starting is defined by the area of major pathology, so anterior or posterior starting does not the matter.

The use a nerve retractor to protect nerve injury is recommended⁽¹⁰⁾. Elbow arthroscopic surgery is a high risk procedure to injure nerves because low volume of elbow joint space and there are many nerves surround elbow joint. In our experiences intra-capsular retractor is a useful instrument for nerve protection (Fig. 4). But the fluid injection to distend the joint capsule before insert arthroscope is not necessary for prevent the nerve injury as previous suggested⁽¹¹⁾.

Conclusion

Elbow arthroscopic surgery is considered as a safe operation since few minor complications were observed and no major neurovascular complications were detected.

What is already known on this topic ?

Elbow arthroscopic surgery has been used for both diagnosis and treatment elbow disorders and

widely accepts as the newer operative techniques. But the complications in elbow arthroscopy are still the concern, especially neurovascular complications. There have been studies on the complications of elbow arthroscopic surgery which reported incidences of overall complications between 7% to 11% and 2% for nerve damage.

What this study adds ?

The overall complications in elbow arthroscopy that performed in HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University, Nakhon Nayok, Thailand were 4% which were nerve injury (transient lateral cutaneous nerve of forearm injury) 2% and cellulitis around a portal site 2%.

Potential conflicts of interest

None.

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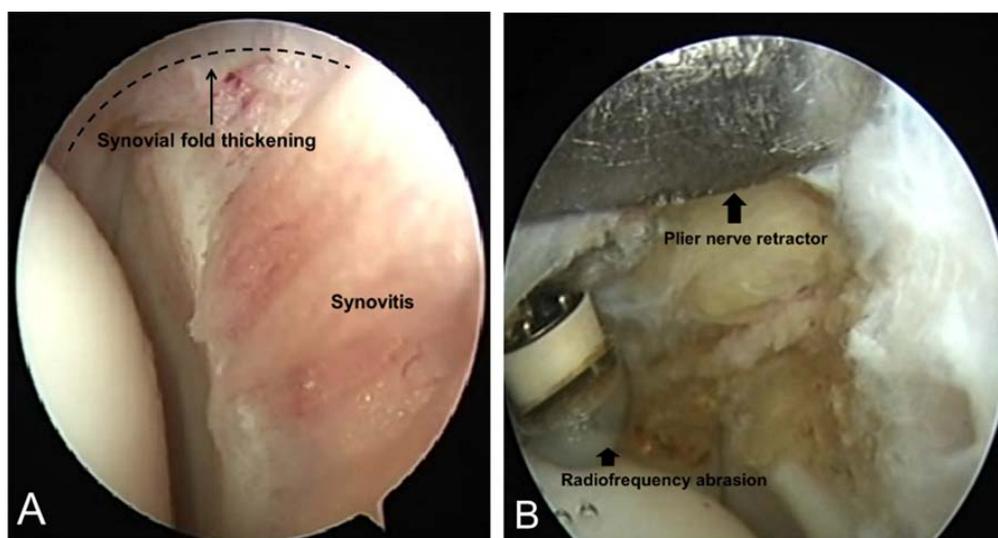


Fig. 4 Pictures from elbow arthroscopic surgery. A) synovitis elbow, B) shrinkage capsule with nerve retractor.

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ภาวะแทรกซ้อนจากการผ่าตัดแบบส่องกล้องข้อศอก 49 ราย และบทบทวนวรรณกรรม

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ภูมิหลัง: การผ่าตัดแบบส่องกล้องข้อศอกเป็นการรักษาที่มีการบาดเจ็บของเนื้อเยื่ออ่อน และได้รับความนิยมมากขึ้นในปัจจุบัน โดยภาวะแทรกซ้อนจากการผ่าตัดมีการรายงานในต่างประเทศเท่านั้น ยังไม่พบรายงานในประเทศไทยมาก่อน

วัตถุประสงค์: เพื่อรายงานภาวะแทรกซ้อนจากการผ่าตัดแบบส่องกล้องข้อศอก โดยเน้นไปที่ภาวะแทรกซ้อนด้านเส้นประสาทและหลอดเลือดได้รับบาดเจ็บ **วัสดุและวิธีการ:** ผู้เขียนได้ดำเนินการเก็บข้อมูลกลุ่มผู้ป่วยที่เข้ารับการผ่าตัดส่องกล้องข้อศอกตั้งแต่เดือนเมษายน พ.ศ. 2554 ถึง เดือนพฤษภาคม พ.ศ. 2557 ทั้งหมด 49 ข้อศอก จากผู้ป่วย 44 รายที่ศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี คณะแพทยศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ จังหวัดนครนายก โดยเก็บรวบรวมข้อมูลตั้งแต่ระยะหลังผ่าตัดและติดตามผลจนถึง 6 สัปดาห์ หลังการผ่าตัด

ผลการศึกษา: พบภาวะแทรกซ้อนจากการผ่าตัดชนิดรุนแรงน้อย 2 ราย (4%) ได้แก่ การได้รับบาดเจ็บของเส้นประสาทบริเวณความรู้อีกรบริเวณผิวหนังแบบชั่วคราว 1 ราย (2%) และการติดเชื้อของผิวหนังบริเวณแผลผ่าตัด 1 ราย (2%) โดยที่ไม่พบผลข้างเคียงชนิดรุนแรง

สรุป: การศึกษานี้เป็นตัวบ่งบอกได้ว่าการผ่าตัดส่องกล้องที่ข้อศอกสามารถทำได้อย่างปลอดภัย และมีภาวะแทรกซ้อนจากการผ่าตัดน้อย
