Treatment of Acute Acromioclavicular joint injuries using hook plate: a retrospective study

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Abstract

Introduction: Traumatic injuries of the AC joint are frequent in orthopedic practice accounting for about 9% of all shoulder injuries, the most commonly used classification is Rockwood. The purpose of this retrospective IVevidence level study is to present our experience using for the joint stabilization the hook plate described by Blazer 1976.

Material and Methods: from the period of August 2005 to March 2012 312 patients with acromio-clavicular dislocations were treated in our department, 51 were classified as III and IV type following Rockwood classification, 38 patients (11%) were treated with hook plate. The mean follow-up was 19 months, ranging from 11 to 26 months. The mean age was 36 years old (20-49). The surgery was performed at the average of 14 days from de injury.

Results: Patients were evaluated 6 and 18 months with the modified Quick-DASH, VAS and Constant Murley scales with 95% satisfaction.

Discussion: In the surgical treatment, the method of fixation for the stability of the acute AC injury is a matter of debate. In clinical experience, none of them have proven to be any better than others. Based on an old principle of surgery in which different procedures of equal result should be chosen the simplest, animated by simplicity and reproducibility in the technique with low number of complications and an early rehabilitation we continue using this surgical procedure

Key words: Luxation A-C, Plate Hook. Level of Evidence: IV

Introduction

Traumatic lesions of the acromio-clavicular joint (AC) are common in orthopedic practice accounting for about 9% of all traumas in the shoulder girdle[1-4] especially in young people where the percentage increases to 43% of the Shoulder trauma[4]. Acute traumatic ligament injuries of AC have been classified in different degrees depending on the degree of separation AC and the injury of anatomical structures involved5-6, the most used classification is Rockwood ordered in 6 types with the intermediate (type 3) being the most controversial in terms of its treatment. (Table I) Numerous techniques have been described for surgical stabilization, more than 80 registered; the most used could be divided in four groups having the stabilization method into account:

1. Osteosynthesis material with screws [18], Kirshner [7] wires or hook plate [24-25]
2. Synthetic material like endobotom[11]
3. Ligament transfers[11]
4. Reconstructions with tendon grafts[24]

Although numerous surgical procedures for the intermediate and advanced stages (3 to 6) have been described, none have proven superior to others in practice[9].(Photo 10) Surgery aims to restore congruence and joint stability avoiding painful sequelae and decreased strength due to long-term scapular dyskinesia [4,5,13,15,16]. The purpose of this retrospective study IV evidence level is to present our experience using for the joint stabilization the hook plate described by Balser in 1976.[24,25]

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Methods and Methods

From the period of August 2005 to March 2012, 312 patients with acromio-clavicular dislocations were treated in our department. A retrospective study was set up to study the outcome in these cases and ethical approval was taken from the institutional ethical committee. Amongst cases, 51 were classified as III and IV type following Rockwood classification, 38 patients (11%) were treated with hook plate, 38 men, 22 cases of type III (57 %) and 16 cases of type IV (42 %). The radiological evaluation was performed with anteroposterior shoulder, lateral scapula and Zanca position projections, in 5 patients a 3-D CT was used to dismiss injuries associated to the scapula. Clinical examination showed clear acromioclavicular vertical instability with prominence of the clavicle (sign of the key) and pain on the palpation of the joint. The mean follow-up was 19 (11-26) months, the mechanisms of production were 19 (50%) sport accidents, 15 (37%) traffic accidents and 5 (13%) accidents on the workplace. The mean age was 36 years old (20-49). The time elapsed between the injury and the surgery was 14 (5-25) days. Photo2. The inclusion criteria for the studied series were patients with AC 3 and 4 isolated dislocation with an evolution shorter than 30 days from the trauma. We excluded the associated injuries such as shoulder girdle fractures, clinical

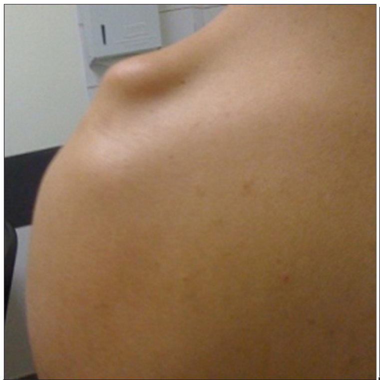

Figure 1: Pacient withdislocation A-C grade IV left shoulder posterior view of the patient

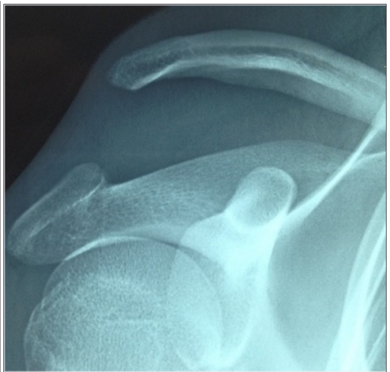

Figure 2: X-ray of dislocation A-C grade V, Anteroposterior projection of Zanca.

pathologies that directly affect the healing process. For the surgical procedure, the hook plate (synthes - AO) was used in 12 cases and similar plates of national origin in 26 cases. (Table II) Between 12 and 14 weeks after surgery, plaque extraction was performed in all treated cases

Surgical technique

The procedure was performed under general anesthesia in a beach chair position with cervical collar. The skin incision was made lateral to the clavicle and centered at the acromio-clavicular joint approximately 5 centimeters long, distal clavicle exposition with longitudinal incision to the axis of the clavicle from muscle fascia to periosteum in a single plane. (Photo 3) In young patients, the presence of the injured meniscus A-C was observed, which was resected in all cases. We perform the placement of the implant by reducing the joint by raising the member from the elbow in flexion, controlling the correct positioning of the implant on the back of the clavicle and the height of the hook in its path in the joint in this way avoid frictions in the Lower edge of the acromion, wound closure and shoulder immobilization with a sling. (Photo 4) The average time of surgery was 30 minutes. We performed 24 hours of postoperative hospitalization, at the first consultation at 72 hours of surgery we started with protocol of active pendular movements and passively abduction of the shoulder without passing the 90° of the affected shoulder angle at home. Radiological control is performed where joint and implant stability is checked, it is repeated at 3 and 6 weeks after surgery. At the 10 days after the surgery approximately we remove skin sutures and continue rehabilitation in specialized center. The use of the sling was extended for 2 weeks then we moved to the alternate use depending on patient's symptomatology. Removal of the implant is indicated from 12 to 15 weeks after surgery with sedation of the patient and local anesthesia without hospitalization. After this procedure, we indicated sling for 48 hours allowing the habitual use of the member past this period of time.

Table I : Rockwood Classification for Dislocations A-C

Rwnc	Jge,?-C	Jge,A]A	D_qag_ Deltotrapezoidal	A-C X-ray Image	Anp_amClavicular X-rayImage	Pcbsarg`jc A-C Joint
Ġ	Qnp_g	ĞÕŹŁŃØ	ĞÕŹŁŃØ	I ÖŐŐ ŁÓÄCÆ-1.3 cm)	Lmpk_j	I Æ
ĞĞ	Psnrspcb	Qnp_g	ĞÕŹŁŃØ	<03#	Cvn_1bcb	Wcq
ĞĞĞ	Psnrspcb	Psnrspcb	Psnrspcb	03# -100%	Cvn 1bcb	Wcq
Ġ	Psnrspcb	Psnrspcb	Psnrspcb	Gapc_qcb	Alavicle displaced posteriorly	Lm
İ	Psnrspcb	Psnrspcb	Psnrspcb	/..# -300%	L-?	Lm
İĠ	Psnrspcb	Grar	Psnrspcb	Bcapc_qcb	L-?	Lm

Figure 3: A-C joint approach on the transverse right shoulder of the clavicle.

Figure 4: X-ray in anteroposterior projection with implanted Plate hook.

Results

Patients were evaluated 6 and 18 months with the modified Quick-DASH, VAS and Constant Murley scales and periodic radiological controls for recording the results. The modified Constant Murley scale showed a score of 89 points for 89% of all cases. The Quick DASH was 11 points for 90% of the total cases. The visual analogue assessment scale (VAS) was 1 point for 91% of the total cases. SeeTables III-IV-V Patient satisfaction was 95% (37/38) and only 1 patient 5% was considered unsatisfactory due to local intolerance, although maintaining the AC relationship normal (working patient). Patients who had administrative tasks were discharged at the average two weeks, patients whose activities are effort or athletes were allowed to start activities in the fourth month. In 95% of the cases radiographic controls showed a normal acromioclavicular relationship and in 5% there was a partial loss of the reduction even in these cases the evaluation scales were satisfactory We registered complications in 3 patients (10%), 2 superficial infections (cellulitis), treated successfully with ATB and a deep infection that forced the removal of the osteosynthesis material at 60 days and treatment with ATB managed by the infectology department, in this case there was a loss of the reduction however this did not significantly affect the final result..

Discussion

It is widely accepted for Stages 1 and 2 of Rockwood classification, the conservative treatment with immobilization, analgesic and local cold due to the predictability in the results; in advanced stages 4, 5 and 6 the surgical indication would be adequate, while the Stage 3 remains the most controversial. Prospective randomized studies show a slight preference for conservative treatment,

while accepting the limitations of long-term outcomes [4,5,13,14,16]. In the surgical treatment, the fixation method for the stability of AC is also a matter of debate, biomechanical studies performed on cadaveric parts have shown differences in behavior and resistance when subjected to traction and cyclic movements10, however, in clinical experience, none of them have proven to be any better than others and in the different series all of them have similar complications in variable degree such as loss of reduction, ossification, osteolysis, infections and rupture of the implants. Published complications are only for the Phemister technique of 75% for the Bosworth technique 13% 27 and evaluated in general[29]. It is interesting that when the loss of AC reduction is not severe it has little clinical correlation, ie, it does not substantially influence the final outcome. The complications described in the use of the hook plate 35 are acromion fracture, osteolysis, and implant loosening. It is worth noting that the common denominator of these complications is the maintenance of the plate beyond the useful time (maximum 3 or 4 months). In our series, this type of complications has not been a problem, due to the removal of the material in the indicated time. The main weakness of this study consists on the one hand to the lack of a control group, a short follow-up and, on the other hand, the limited and heterogeneous number of patients. Based on an old principle of surgery in which different procedures of equal result, one should choose the simplest, animated by the simplicity and reproducibility in the technique of hook plate with low number of complications and an early rehabilitation, we continue using this surgical procedure for this group of patients.

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