

# PRACTICAL SUMMARIES IN ACUTE CARE

*A Focused Topical Review of the Literature for the Acute Care Practitioner*

## What's New in Shoulder Dislocation Management?

*Author:* **Moira Davenport, MD, CAQSM**, Assistant Professor of Emergency Medicine, Assistant Professor of Orthopaedic Surgery, NYU Medical Center, Bellevue Hospital Center, Hospital for Joint Diseases, New York, NY.

*Peer Reviewer:* **Mary Jo Bowman, MD, FAAP, FLP**, Associate Professor of Clinical Pediatrics, Ohio State University College of Medicine; Attending Physician and PEM Fellowship Director, Columbus Children's Hospital, Columbus, OH.

### Introduction

Shoulder dislocations account for approximately 50% of all dislocations encountered by health care providers.<sup>1</sup> Most dislocations (90-98%)<sup>2</sup> are anterior in nature and result from trauma sustained with the affected extremity abducted and externally rotated. The humeral head most frequently sits in the subcoracoid region but subglenoid, subclavicular, and intrathoracic dislocations are possible. Posterior dislocations are commonly associated with seizure activity, electrical injury, and psychiatric disorders. Posterior dislocations may be difficult to diagnose clinically. Close attention should be given to the x-rays, particularly the axillary view, to ensure that these injuries are not missed.

Standard-of-care currently includes a thorough neurovascular examination, pre-reduction x-rays (AP, lateral, and axillary views), and reduc-

tion. Analgesics are a critical aspect of management throughout the patient's stay in the emergency department. A wide range of agents can be used, including oral non-steroidal agents, intravenous opioids, and conscious sedation. Several reduction techniques are well reported throughout the literature: traction-countertraction; scapular manipulation (pushing the inferior border of the scapula medially and the superior border laterally to rotate the glenoid); Kocher's method (adduction, forward elevation and external rotation); and Stimson's technique (patient prone with the affected extremity off the stretcher to allow gravity to relocate the humeral head). Choice of reduction method is multifactorial and is based on physician skill, physician preference, and staffing levels. Post-reduction care is somewhat controversial; however, current standards of post reduction care include repeat

neurovascular checks, post reduction x-rays, and immobilization.

Several complications may arise following a shoulder dislocation. The most common of these is instability resulting in recurrent dislocation(s). Age at the time of first dislocation is directly correlated to the likelihood of subsequent dislocations, with age younger than 20 associated with a 92% chance of recurrent injury. Hill-Sachs fractures are fractures of the posterior humeral head; they result from the humerus hitting the glenoid during the anterior dislocation process. Reverse Hill-Sachs fractures occur on the anterior aspect of the humerus following a posterior dislocation. Neurologic deficits are also common after shoulder dislocation. The axillary nerve is most commonly affected, occurring in up to 20% of all shoulder dislocations. However, injury to the median, radial, and ulnar nerves is commonly reported. Bankart lesions are labral tears at the

VOLUME II • NUMBER 7 • JULY 2007 • PAGES 53-60  
AHC Media LLC Home Page—[www.ahcmedia.com](http://www.ahcmedia.com) • CME for Physicians—[www.cmeweb.com](http://www.cmeweb.com)

**Statement of Financial Disclosure:** Executive Editor, Ann M. Dietrich, MD, FAAP, FACEP, Dr. Davenport (author), and Dr. Bowman (peer reviewer) reported no financial relationships with companies having ties to this field of study.

site of the inferior glenohumeral ligament (IGHL) and frequently occur during anterior shoulder dislocations. Inadequate healing of this injury may contribute to the high rate of recurrent dislocation as the labrum/IGHL complex contributes significantly to anterior shoulder stability. All patients sustaining shoulder dislocations should be followed up by an orthopedic surgeon/sports medicine specialist

to facilitate physical therapy and to discuss the possibility of definitive surgical management. Surgical stabilization of the shoulder often is considered based on the patient's age, hand dominance, and professional and recreational activities.

## Are Pre-Reduction X-rays Necessary?

**Source:** Emond M, Le Sage N, Lavoie A, et al. Clinical factors predicting fractures associated with an anterior shoulder dislocation. *Acad Emerg Med* 2004;11:853-8.

Recent literature has questioned the need for pre-reduction x-rays in patients likely to have suffered anterior shoulder dislocations. This study attempted to develop a clinical decision rule to identify patients likely to have a significant fracture (defined as any fracture other than a Hill-Sachs fracture) associated with shoulder dislocation in an effort to decrease the number of pre-reduction x-rays taken. A 5-year retrospective chart review yielded a study group of 334 patients, 85 of whom sustained a significant fracture. Age, gender, medical history, shoulder injury history, and mechanism of injury were recorded.

The following characteristics were associated with significantly higher rates of fracture/dislocation:

- age > 40
- first shoulder dislocation
- injury mechanisms:
  - fall > 1 flight of stairs
  - fight/assault
  - MVC (motor vehicle collision)

The authors conclude that these predictive factors, once validated on a larger scale, could be used to decrease pre-reduction x-rays.

### Commentary

This study continues a trend toward increasing efficiency and cost

effectiveness in emergency medicine. However, there are several faults with the study. The retrospective nature of the review may not be an adequate representation of the clinical picture given the potential for incomplete documentation in the patient chart. Also, 106 patients did not have pre-reduction x-rays taken. This raises the question of whether subsequently discovered fractures may have been incurred during the reduction process and effectively eliminates a comparative diagnostic standard. Next, the accuracy of these decision rules was calculated by applying the rules to the same group of patients from which they were derived. The authors do acknowledge this weakness and also address the need for prospective validation of the clinical decision rules. Finally, the authors do not address the medicolegal implications of not obtaining pre-reduction x-rays, particularly as they relate to the potential of iatrogenic injury or injury progression during reduction.

## Is Scapular Manipulation an Effective Reduction Technique?

**Source:** Baykal B, Sener S, Turkan H. Scapular manipulation technique for reduction of traumatic anterior shoulder dislocations: experiences of an academic emergency department. *Emerg Med J* 2005;22:336-8.

This prospective study non-consecutively enrolled 41 patients with anterior shoulder dislocations. Although several variations of scapular manipulation exist in the literature, this study examined the efficacy of a single physician performing the procedure with the patient prone. The prone position places the affected extremity in 90° of forward flexion. The examiner then stabilizes the superior aspect of

### Subscriber Information

**Customer Service: 1-800-688-2421.**

Customer Service E-Mail: [customerservice@ahcmedia.com](mailto:customerservice@ahcmedia.com)

World-Wide Web: [www.ahcmedia.com](http://www.ahcmedia.com)

### Subscription Prices

#### United States

\$299 per year. Add \$9.95 for shipping & handling (Student/Resident rate: \$144.50).

#### Multiple Copies

Discounts are available for group subscriptions.

For pricing information, call Tria Kreuzer at (404) 262-5482.

#### Outside the United States

\$329 per year plus GST (Student/Resident rate: \$159.50 plus GST).

*Practical Summaries in Acute Care*, ISSN 1930-1103, is published monthly by AHC Media LLC, 3525 Piedmont Rd., NE, Bldg. 6, Suite 400, Atlanta, GA 30305.

SENIOR VICE PRESIDENT/PUBLISHER: Brenda L. Mooney

ASSOCIATE PUBLISHER: Lee Landenberger

SENIOR MANAGING EDITOR: Suzanne Thatcher

MARKETING MANAGER: Shawn DeMario

GST Registration Number: R128870672.

Periodical postage paid at Atlanta, GA.

POSTMASTER: Send address changes to *Practical Summaries in Acute Care*, P.O. Box 740059, Atlanta, GA 30374.

Copyright © 2007 by AHC Media LLC. All rights reserved. No part of this newsletter may be reproduced in any form or incorporated into any information-retrieval system without the written permission of the copyright owner.

**Back Issues:** \$50 per issue. Missing issues will be fulfilled by Customer Service free of charge when contacted within one month of the missing issue's date.

This is an educational publication designed to present scientific information and opinion to health professionals, to stimulate thought, and further investigation. It does not provide advice regarding medical diagnosis or treatment for any individual case. Opinions expressed are not necessarily those of this publication.

Mention of products or services does not constitute endorsement. Professional counsel should be sought for specific situations. The publication is not intended for use by the layman.

### Accreditation

AHC Media LLC is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

AHC Media LLC designates this educational activity for a maximum of 20 *AMA PRA Category 1 Credits™*. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Approved by the American College of Emergency Physicians for 20 hours of ACEP Category 1 credit.

*Practical Summaries in Acute Care* has been reviewed and is acceptable for up to 12 Prescribed credits by the American Academy of Family Physicians. AAFP accreditation begins 6/01/07. Term for approval is for one year from this date. Each semester is approved for 6 Prescribed credits. Credit may be claimed for 1 year from the date of this issue. The AAFP invites comments on any activity that has been approved for AAFP CME credit. Please forward your comments on the quality of this activity to [cmecomment@aafp.org](mailto:cmecomment@aafp.org).

This CME activity is intended for emergency, urgent care, and family practice physicians. It is in effect for 24 months from the date of the publication.

### Questions & Comments

Please call **Suzanne Thatcher**, Senior Managing Editor, at (404) 262-5514 between 8:30 a.m. and 4:30 p.m. ET, Monday-Friday.



**AHC Media LLC**

the scapula while pushing the inferior aspect toward the spine. Twenty-six males and 15 females were enrolled, 7 of whom had sustained recurrent dislocations. The initial attempt (done without sedation) was successful in 37 of 41 patients. Second attempt at scapular manipulation, with sedation, was successful in 2 patients. The final 2 patients were successfully reduced on the third attempt at scapular manipulation, again using sedation. No complications were noted with this technique, including the 5 patients with known greater tuberosity fractures associated with the dislocation.

### Commentary

This study's results are consistent with the reported 78-96% success rate of scapular manipulation found in the literature. The ability of a single physician to safely and effectively perform any reduction technique is a key consideration for the single coverage physician in a busy setting. The efficacy of the reduction technique without sedation is another benefit of this technique, again as it relates to single coverage care settings. The non-consecutive enrollment of patients may likely represent a selection bias as patients with more complicated injuries may have not been included in the study. This would contribute to a slight elevation in the overall success of this technique. However, this paper does confirm that scapular manipulation is a viable option for shoulder reduction.

---

## What is the "Best of Both" Maneuver?

---

**Source:** Sagarin MJ. Best of both (BOB) maneuver for rapid reduction of anterior shoulder dislocation. *J Emerg Med* 2005;29:313-6.

Sagarin reports the efficacy of a technique combining scapular

manipulation with traction/counter-traction to reduce dislocated shoulders. This method takes full advantage of the forces of gravity and the body weight of both the physician and the patient to obtain rapid reduction. The technique is as follows:

1. Elevate the head of the bed to 90°;
2. Place the patient's unaffected shoulder against the stretcher;
3. Flex the elbow of the affected extremity to 90°;
4. Physician A places one hand on the patient's proximal forearm and the other hand on the patient's hand;
5. Physician A should gently use his/her body weight to apply downward traction to the affected extremity; and
6. Physician B performs scapular manipulation while Physician A continues downward traction and applies external rotation.

The authors report very rapid results with this technique, stating "most" reductions were complete within 10 seconds. The authors also note a decreased need for sedation with this technique.

### Commentary

Given the variety of shoulder reduction techniques available to the acute care physician, it is not surprising to see two methods combined to yield a new procedure. Although this technique seems effective, it may be of limited usefulness in certain patient populations (e.g., the severely obese patient and the multiple trauma patient). The technique may not be possible in smaller care settings based on the need for two physicians to adequately perform the reduction. This paper is a technique report without specific data, and further studies are needed to compare this method with more traditional modes. However, this does represent another option avail-

able to the physician faced with a difficult shoulder dislocation.

---

## Is Kocher's Method Still Relevant?

---

**Source:** Chitgopkar SD, Khan M. Painless reduction of anterior shoulder dislocation by Kocher's method. *Injury* 2005;36:1182-4.

Kocher's method of shoulder reduction is commonly cited as a risky technique in that application of traction often subjects the patient to significant pain and can induce a variety of humeral fractures. This paper re-examines Kocher's original work and discovers a significant mistranslation: Kocher never proposed traction as part of his reduction technique. Kocher's method, as originally intended, is as follows:

1. Place the patient supine on the stretcher;
2. The physician should stand on the side of the affected extremity
3. Flex the elbow to 90°;
4. Adduct the arm;
5. With one of the physician's hands on the wrist and one on the shoulder, externally rotate the affected extremity; and
6. Forward flex the extremity to 20°.

Chitgopkar and Khan enrolled 12 patients over a 40-month period. Ten of the dislocations were reduced with Kocher's method; none of these patients required conscious sedation for the procedure. No complications were reported.

### Commentary

The author points out an interesting misinterpretation of Kocher's original work. However, the small study size in a fairly long time period raises the question of significant selection bias. There is no mention of how included patients were selected, which further contributes to the selection bias. Fur-

thermore, the question must be asked regarding the methods used to reduce the 2 shoulder dislocations not reduced via Kocher's method as well as other methods used to reduce the other dislocations presenting to the emergency department during the study period.

---

## Is External Rotation Alone Sufficient to Reduce a Shoulder Dislocation?

---

**Source:** Eachempati KK, Dua A, Malhotra R, et al. The external rotation method for reduction of acute anterior dislocations and fracture-dislocations of the shoulder. *J Bone Joint Surg Am* 2004;86A:2431-4.

Traditional methods to reduce shoulder dislocations are typically painful, often requiring significant amounts of sedation. This paper presents a slight variation of Kocher's method to reduce a shoulder with minimal sedation. The steps are the same as Kocher's with the exception of forward flexion preceding external rotation:

1. Place the patient supine on the stretcher;
2. The physician should stand on the side of the affected extremity;
3. Flex the elbow to 90°;
4. Adduct the arm;
5. Forward flex the extremity to 20°; and
6. With one of the physician's hands on the wrist and one on the shoulder, externally rotate the affected extremity.

Forty patients were enrolled (non-consecutively), with 36 successful reductions on the first attempt. Twenty-nine of these reductions were accomplished without sedation. Of the non-successful reductions, 2 patients were reduced on the second attempt of Kocher's method. The remaining 2

patients had displaced fractures of the greater tuberosity. Multiple other methods of reduction were attempted unsuccessfully and operative intervention was ultimately required in both cases. No complications were noted.

### Commentary

Eachempati and colleagues cite several benefits of this technique, including the need for a single physician, the decreased need for sedation, a high success rate, and a low complication rate. This method (along with several others featured in this paper) focus on the successful reduction of dislocated shoulders without using traction. Traction, even when performed with the patient consciously sedated, has been shown to increase muscle spasm and significantly complicate attempts at reduction.<sup>3</sup> This study is significantly larger than that by Chitgopkar, but the non-consecutive enrollment of patients remains a significant limiting factor as selection bias cannot be ruled out. Further studies are necessary to determine if the order of forward elevation versus external rotation is clinically or functionally significant. Regardless of the order in which the various steps are performed, the work of Eachempati and Chitgopkar serve to reinforce the concept that adduction-forward elevation-external rotation is a reasonable technique choice for rapid shoulder reduction.

---

## Is Propofol Better than Fentanyl/Midazolam for Sedation?

---

**Source:** Taylor DM, O'Brien D, Ritchie D, et al. Propofol versus midazolam/fentanyl for reduction of anterior shoulder dislocation. *Acad Emerg Med* 2005;12:13-9.

Conscious sedation is commonly required in the acute care setting

to allow for patient comfort and muscle relaxation during painful procedures. Several agents and combinations thereof are available to the physician for these purposes, with fentanyl/midazolam being commonly used. Propofol has recently gained popularity as a single sedation agent based on its rapid onset/rapid clearance, level of sedation achieved, and ease of use. This paper aimed to compare the efficacy and safety of fentanyl/midazolam to that of propofol during reduction of shoulder dislocations via Kocher's method. This prospective, randomized study was semi-blinded. The physician administering sedation was not blinded to the medication used due to the obviously different appearance of the medications. However, physicians performing the reduction were blinded to the medication used and it is this group of physicians that completed the data form. Patients were enrolled in a non-consecutive fashion. All patients did receive morphine +/- metoclopramide prior to induction of sedation. Forty-eight patients received propofol and 38 received fentanyl/midazolam. Medication doses were administered to the closing of the patient's eyes, not to a particular weight based dose. Data points collected included patient's body habitus, number of reduction attempts, maneuvers attempted, muscle tone with the first reduction attempt and with successful reduction in those cases requiring multiple attempts, ease of reduction, and complications.

The mean total dose of propofol was 148 mg, while the mean total dose of midazolam/fentanyl was 9.7 mg/4.1 mg respectively. Patients receiving propofol woke from the procedure sooner than the fentanyl/midazolam group and also had lower muscle tone than the fentanyl/midazolam group; however, these differences were not significant. Patients in the propofol group required fewer reduction

attempts and fewer reduction techniques; however, these differences were not significant. Respiratory depression was slightly more common in the propofol group but this difference did not approach significance. No patient in either group required rescue breathing or intubation.

### Commentary

Patient comfort and safety during procedures are of considerable importance to the treating physician(s). This study demonstrates that propofol is a reasonable alternative to fentanyl/midazolam for sedation purposes. The shorter time of sedation, the greater muscle relaxation, and the fewer reduction attempts highlight propofol's benefits and warrant its further investigation. However, this study was relatively small and did not provide the power needed to make definitive comparisons between the agents. Furthermore, the study groups were less than ideally matched, which may affect the validity of results. This is particularly relevant in regard to the larger number of males in the propofol group and may actually under represent propofol's muscle relaxant qualities. Also, the non-consecutive enrollment of patients may represent a subtle selection bias, as has been seen in several of the mentioned studies.

---

## How Should Patients Be Immobilized After Shoulder Dislocation?

---

**Source:** Miller BS, Sonnabend DH, Hatrick C, et al. Should acute anterior dislocations of the shoulder be immobilized in external rotation? A cadaveric study. *J Shoulder Elbow Surg* 2004;13:589-92.

Following shoulder dislocation, patients are typically placed in

shoulder immobilizers with the affected extremity in internal rotation. Recent studies have questioned this practice given that 97% of these patients sustain a Bankart lesion (partial avulsion of the labrum from the glenoid) at the time of dislocation.<sup>4</sup> It is believed that inadequate healing of the glenoid contributes to the high rate of recurrent dislocations.<sup>5</sup> Miller and colleagues designed a cadaveric model to examine the effect of humeral external rotation on glenoid-labrum dynamics. Ten cadaveric shoulders all had Bankart lesions arthroscopically induced. Glenoid-labral contact forces were measured with the humerus in 60° internal rotation, neutral position, 45° external rotation, and 60° external rotation. There were no contact forces detected in any of the shoulders in internal rotation. Four shoulders had no detectable contact in neutral. The remaining 6 shoulders had minimal contact in the neutral position. All 10 shoulders demonstrated significant contact forces (average 83.5 g) with external rotation. No increase in glenoid-labrum contact forces were found with the affected extremity in 60° external rotation.

### Commentary

The study by Miller and colleagues does show that humeral position affects glenoid-labrum contact forces; however, this study is cadaver based and has a small number of subjects. However, these findings have potential implications for clinical practice and should serve as the basis for further clinical investigations. If clinical studies yield similar results, it may be possible to decrease the morbidity associated with shoulder dislocations, particularly recurrent dislocations.

---

## What Does the Literature Say About Ideal Discharge Position?

---

**Source:** Funk L, Smith M. Best evidence topic report. How to immobilize after shoulder dislocation? *Emerg Med J* 2005;22:813-6.

Funk and Smith conducted a literature review in an attempt to address the issue of ideal position in which to discharge patients after shoulder dislocation. Four studies were found. An additional cadaveric study<sup>6</sup> found results similar to those of Miller and colleagues. A prospective study<sup>7</sup> by Itoi and colleagues used MRI to visually examine the contact between the glenoid and the labrum at various degrees of internal and external rotation. The authors also found maximum contact with the affected extremity in external rotation. This group then went on to conduct a clinically based study attempting to determine the ideal position in which to discharge shoulder dislocation patients. This prospective, randomized trial<sup>8</sup> enrolled 40 first-time shoulder dislocators. Patients were discharged in either 60° internal rotation or 45° external rotation. Patients were followed for a mean of 15.5 months. No patients discharged in external rotation sustained recurrent dislocation, while 30% of the internal rotation group sustained subsequent dislocations. This difference was statistically significant. Funk and Smith conclude that clinicians should consider discharging patients in external rotation following shoulder dislocation.

### Commentary

The literature search by Funk and Smith show that the theory of discharging shoulder dislocation patients in external rotation is gaining strength and has been reinforced by multiple

cadaveric studies. Although the clinical study by Itoi is a start, further work is needed before clear clinical recommendations can be made. This literature review also raises the question of how to discharge patients in external rotation from a practical standpoint to maximize patient compliance.

---

## **How Common are Nerve Injuries After Shoulder Dislocation?**

**Source:** Yeap JS, Lee DJ, Frazir M, et al. Nerve Injuries in Anterior Shoulder Dislocations. *Med J Malaysia* 2004;59:450-4.

Nerve injury is a commonly reported complication following shoulder dislocation, with clinically detected incidence reported from 3-21%. Yeap and colleagues designed a retrospective crossover study in an attempt to narrow this wide range and further delineate nerve injuries following anterior shoulder dislocations. All shoulder dislocation patients seen from October 1998 to September 2000 were considered for inclusion. Twenty-six patients were excluded on the basis of incomplete medical records, leaving 100 patients with 115 shoulder dislocations in the study group. Baseline neurologic exams were not completed in 13 patients. Eight patients had neurologic deficits before any reduction attempts; injury to the axillary nerve was the most common. Three of these patients had significant neurologic improvement post reduction, while the remaining 5 patients had no documented post reduction neurologic exam. More nerve injuries were found in patients younger than age 40 but the incidence was higher in those over age 40. The authors also note that multiple details were missing from the charts, most notably the name of the physician performing the reduction, the amount

and type of analgesics used, and the method of reduction. Yeap et al raise the concern that these omissions, along with the lack of a documented pre- and post-reduction neurologic exams could subject the treating physician to significant medicolegal ramifications.

### **Commentary**

This retrospective study by Yeap et al is consistent with previously published literature documenting the incidence and type of upper extremity nerve injury following anterior shoulder dislocations. However, several methodological changes could have strengthened the findings. In their introduction, the authors quote several electromyogram (EMG)-based studies that further delineate associated nerve injuries. However, a weakness of this study is the lack of follow-up after discharge from the emergency department. Long-term follow up, both clinical and EMG-based, would have strengthened their findings.

Yeap et al do an excellent job of highlighting the need for a thorough, documented pre- and post-reduction neurologic examination of the shoulder dislocation patient. Although physicians are frequently reminded of the need to improve documentation, this study shows that more efforts are still needed in this aspect of practice.

---

## **Are Axillary Artery Injuries Common after Anterior Shoulder Dislocation?**

**Source:** Kelley SP, Hinsche AF, Hossain JF. Axillary artery transection following anterior shoulder dislocation: classical presentation and current concepts. *Injury*. 2004;35:1128-32.

Kelley and colleagues report a case of axillary artery injury

following recurrent shoulder dislocation. The patient had suffered a dislocation 1 year prior to presentation and sustained a second dislocation following a trip and fall. The pre-reduction course was significant for undetectable radial and brachial pulses but with no neurologic deficits noted. The authors do mention that the neurologic exam was limited by pain and may have missed subtle neurologic deficits. Reduction was achieved without difficulty. However, the patient noted increasing pain post-reduction. The neurologic exam remained unchanged, but axillary edema extending to the anterior chest wall was noted. Emergent angiography confirmed disruption of the third portion of the axillary artery. Embolectomy was performed with reperfusion of the extremity. During the operative procedure, the brachial plexus was noted to be intact. Post operative neurologic deficits were noted in the distribution of the lower cord of the brachial plexus. EMGs at 6 weeks post injury showed persistent C6-C7 deficits.

Following this case, Kelley et al conducted a literature review to determine the incidence of axillary artery injury following anterior shoulder dislocation. Approximately 200 cases have been reported. It is important to note that > 90% of axillary artery injuries occur in those older than age 50. The theory is that loss of elasticity due to atherosclerosis contributes to this phenomenon. The authors also note that 60% of patients with axillary artery injuries sustain concurrent brachial plexus injuries. Also, it is believed that patients with multiple dislocations are at higher risk for axillary artery injury as scar tissue from previous dislocations may cause the artery to be somewhat fixed, decreasing the artery's inherent compliance.

## Commentary

This case report and literature review by Kelley and colleagues raises awareness of the classic triad associated with axillary artery injury following shoulder dislocation:

- Anterior shoulder dislocation;
- Absent radial pulse; and
- Axillary hematoma.

They also point out the greater potential for axillary artery injuries in those older than age 50 sustaining shoulder dislocations, particularly recurrent dislocations. Given the aging of the general population, this review of the anatomy and pathophysiology is particularly relevant for the acute care physician.

---

## Conclusions

Shoulder dislocation remains one of the most common orthopedic injuries seen in the emergency department. Initial management of these injuries should consist of thorough pre- and post-reduction neurovascular examinations and rapidly obtained radiographic studies (AP, lateral, and axillary views) to document the type of dislocation.

Several reduction techniques are available to the acute care physician, allowing for personal skill, preference, and staffing concerns to be considered. Analgesics, including conscious sedation, is an integral component of reduction. Choice of sedation agent(s) is dependent on the individual physician, with some input from hospital formulary committees. Taylor et al have shown that propofol is a reasonable alternative to fentanyl/midazolam, confirming what many physicians had found in practice. The wide variety of successful reduction techniques gives the treating physician several options and may limit the amount of sedation needed and should be considered while choosing a sedative agent.

The ideal position in which to dis-

charge patients after shoulder dislocation remains controversial. Cadaveric studies by Miller and Itoi suggest that patients may benefit from discharge in external rotation. The initial clinical study by Itoi continues to advance this idea and should hopefully lead to larger clinical studies.

Most injuries have associated complications, and shoulder dislocation is no exception. The clinician should consider the possibility of nerve injury, particularly axillary nerve. Pre- and post-reduction neurologic exams are critical to monitoring this complication. Axillary artery injuries should be suspected in patients older than 50 years of age who have a history of recurrent dislocation, given the decreased arterial elasticity associated with atherosclerosis. Regardless of the immediate presence of complications, all patients sustaining a shoulder dislocation should follow up with an orthopedic surgeon to maximize physical therapy options and to discuss the potential need for surgery.

## References

1. Blake R, Hoffman J. Emergency

- department evaluation and treatment of the shoulder and humerus. *Emerg Med Clin North Am* 1999;17:859-76.
2. Hill JA. Epidemiologic perspective on shoulder injuries. *Clin Sports Med* 1983;2:241-7.
3. Uglow MG. Kocher's painless reduction of anterior dislocation of the shoulder: a prospective randomized trial. *Injury* 1998;29:135-7.
4. Arciero RA, Taylor DC, Snyder RJ, et al. Arthroscopic bioabsorbable tack stabilization of initial anterior shoulder dislocations: a preliminary report. *Arthroscopy* 1995;11:410-7.
5. Hovelius L, Augustini BG, Fredin H, et al. Primary anterior dislocation of the shoulder in young patients. A ten-year prospective study. *J Bone Joint Surg Am* 1996;78:1677-84.
6. Itoi E, Hatakeyama Y, Urayama M, et al. Position of immobilization after dislocation of the shoulder. A cadaveric study. *J Bone Joint Surg* 1999;81:385-90.
7. Itoi E, Sashi R, Minagawa H, et al. Position of immobilization after dislocation of the gleno-

---

## CME OBJECTIVES

Upon completing this program, participants will be able to:

- Summarize the most recent significant studies in emergency medicine/urgent care related to a single topic;
- Discuss up-to-date information about new drugs, techniques, equipment, trials, studies, books, teaching aids, and other information pertinent to the stated topic;
- Evaluate the credibility of published data and recommendations about the stated topic.

---

## CME INSTRUCTIONS

Physicians participate in this continuing medical education program by reading the articles, using the provided references for further research, and studying the CME questions. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material.

After completing this activity, participants must complete the evaluation form provided at the end of each semester (May and November) and return it in the reply envelope provided to receive a credit letter. When an evaluation form is received, a credit letter will be mailed to the participant.

humeral joint. A study with use of magnetic resonance imaging. *J Bone Joint Surg* 2001;83A:661-7.

8. Itoi E, Hatakeyama Y, Kido T, et al. A new method of immobiliza-

tion after traumatic anterior dislocation of the shoulder: a preliminary study. *J Shoulder Elbow Surg* 2003;12:413-5.

## Editorial Board

### Executive Editor

**Ann M. Dietrich, MD, FAAP, FACEP**  
Professor of Pediatrics, Ohio State University; Attending Physician, Columbus Children's Hospital; Associate Pediatric Medical Director, MedFlight, Columbus, Ohio

### Michael L. Coates, MD, MS

Professor and Chair, Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, North Carolina

### Robert Falcone, MD

President, Grant Medical Center; Columbus, Ohio; Clinical Professor of Surgery, Ohio State University, Columbus, Ohio

### Jonathan D. Lawrence, MD, JD, FACEP

Emergency Physician, St. Mary Medical Center, Long Beach, California; Assistant Professor of Medicine, Department of Emergency Medicine, Harbor/UCLA Medical Center, Torrance, California

### Eric L. Legome, MD, FACEP

Program Director, NYU/Bellevue Emergency Medicine Residency; Assistant Professor, New York University School of Medicine, New York

### Grant S. Lipman, MD

Clinical Instructor of Surgery, Division of Emergency Medicine, Stanford University School of Medicine

### Sharon Mace, MD, FACEP, FAAP

Associate Professor, Ohio State University School of Medicine; Faculty, MetroHealth Medical Center/ Emergency Medicine Residency; Clinical Director, Observation Unit; Director, Pediatric Education/ Quality Improvement, Cleveland Clinic Foundation, Cleveland, Ohio

### S.V. Mahadevan, MD, FACEP

Assistant Professor of Surgery, Associate Chief, Division of Emergency Medicine, Stanford University School of Medicine, Stanford, California

### David E. Manthey, MD

Director, Undergraduate Medical Education, Associate Professor, Department of Emergency Medicine, Wake Forest University School of Medicine, Winston-Salem, North Carolina

### Catherine Marco, MD, FACEP

Clinical Professor, Medical University of Ohio; Attending Physician, St. Vincent Mercy Medical Center, Toledo, Ohio

### Amal Mattu, MD

Associate Professor and Program Director, Emergency Medicine Residency, University of Maryland School of Medicine, Baltimore, Maryland

### Ronald Perkin, MD, MA

Professor and Chairman, Department of Pediatrics, The Brody School of Medicine, East Carolina University, Greenville, North Carolina

### Andrew D. Perron, MD, FACEP, FACSM

Residency Program Director, Department of Emergency Medicine, Maine Medical Center, Portland, Maine

### John Santamaria, MD

Affiliate Professor of Pediatrics, University of South Florida School of Medicine, Tampa, Florida

### Laura Sells, MD

Clinical Assistant Professor of Pediatrics, Ohio State University, Columbus, Ohio

## CME QUESTIONS

36. Which of the following is associated with an increased risk of significant fracture with shoulder dislocation?

- Age < 40
- Male gender
- MVC (motor vehicle collision)
- Recurrent dislocation

37. Which of the following applies to propofol-induced sedation?

- Prolonged recovery time
- Hypotension
- Light sedation
- No reported allergies

38. Glenoid-labrum contact forces are greatest with the humeral head in:

- 60° internal rotation
- neutral
- 45° external rotation
- 60° external rotation

39. Which of the following is a step in Kocher's method of shoulder reduction?

- Patient adducts affected extremity
- Physician applies downward traction to affected extremity
- Patient internally rotates affected extremity
- Patient hangs affected extremity off of stretcher

40. Which of the following steps are necessary to perform scapular manipulation?

- Superior aspect of the scapula is pushed medially
- Superior aspect of the scapula should not move
- Inferior tip of the scapula is pushed laterally
- Inferior tip of the scapula is pushed medially

Answers: 36. C; 37. B; 38. C; 39. A; 40. D

### To reproduce any part of this newsletter for promotional purposes, please contact:

Stephen Vance

Phone: (800) 688-2421, ext. 5511

Fax: (800) 284-3291

Email: stephen.vance@ahcmedia.com

Address: AHC Media LLC  
3525 Piedmont Road, Bldg. 6, Ste. 400, Atlanta, GA 30305 USA

### To reproduce any part of AHC newsletters for educational purposes, please contact:

The Copyright Clearance Center for permission

Email: info@copyright.com

Website: www.copyright.com

Phone: (978) 750-8400

Fax: (978) 646-8600

Address: Copyright Clearance Center  
222 Rosewood Drive, Danvers, MA 01923 USA