Canadian Journal of Rural Medicine | Journal canadien de la médecine rurale

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Whistler Health Care Centre wrist fracture study

Bruce Mohr, BSc, MD, CCFP(EM)

CJRM 2002;7(3):199-204

Objective: Our goal was to determine the outcome of the management of displaced distal radius fractures (DDRFs) by primary care physicians working at the Whistler Health Care Centre (WHCC).

Methods: Patients presenting with DDRFs over a 4-month period were treated at the discretion of the attending physician but along generally accepted guidelines. Orthopedic or family physician follow-up was arranged or advised on an emergent, urgent or routine basis as indicated clinically and radiologically. Patients were contacted by telephone 3 months post-injury to determine their functional outcome and whether any unexpected intervention had been required.

Results: Seventy-three DDRFs in 72 patients were reduced primarily by intravenous (Bier) regional anesthesia and casting. Five patients (7%) required emergent orthopedic referral. Fracture reductions were performed on 27 (38%) and referred to orthopedics within 1 week because of potential instability. In 40 patients (56%) fracture reductions were felt to be stable, and routine follow-up with the physician of their choice was advised. Only 2 patients received unexpected surgery. Of those patients who were contacted by telephone at 3 months 92% felt they had a good-to-excellent functional and cosmetic result in terms of appearance, range of motion, pain, stiffness and strength. Six percent felt their outcome was moderate, and 1 patient described the result as poor.

Conclusions: This study provides evidence that primary care physicians working in a rural setting can achieve good outcomes in the management of DDRF.

Objectif : Déterminer le résultat de la prise en charge des fractures de la région distale du radius avec déplacement (FDRD) par des médecins de première ligne travaillant au Centre de soins de santé de Whistler.

Méthodes : Les patients qui se sont présentés avec une FDRD pendant une période de quatre

mois ont été traités à la discrétion du médecin traitant, mais conformément à des guides généralement reconnus. Le suivi par l'orthopédiste ou le médecin de famille a été arrangé ou conseillé pour une raison émergente, urgente ou routinière selon les symptômes cliniques et radiologiques. On a communiqué avec les patients par téléphone trois mois après le traumatisme pour déterminer leur résultat fonctionnel et si une intervention inattendue s'était imposée.

Résultats : On a réduit 73 FDRD chez 72 patients, principalement par pose d'un plâtre sous anesthésie régionale intraveineuse (Bier). Il a fallu référer cinq patients (7 %) à un orthopédiste en raison de symptômes émergents. On a réduit la fracture chez 27 des patients (38 %) qui ont été présentés à un orthopédiste dans la semaine suivante en raison d'une instabilité possible. Chez 40 des patients (56 %), on a considéré que la réduction de la fracture était stable et recommandé un suivi de routine par le médecin de leur choix. Seulement deux patients ont subi une intervention chirurgicale inattendue. Parmi les patients avec lesquels on a communiqué par téléphone à trois mois, 92 % étaient d'avis que leur résultat fonctionnel et esthétique variait de bon à excellent sur les plans de l'apparence, de l'amplitude du mouvement, de la douleur, de la raideur et de la force. Six pour cent étaient d'avis que leur résultat était moyen et un patient a qualifié le résultat de médiocre.

Conclusions : Cette étude démontre que les médecins de première ligne qui œuvrent en contexte rural peuvent obtenir de bons résultats dans la prise en charge de la FDRD.

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Introduction

Orthopedic injuries are common in primary and emergency care settings. In rural areas, management can be difficult because access to orthopedic referral is often limited. In general, orthopedic training for primary care, emergency and even general surgical practitioners is relatively lacking. Much of the wrist fracture literature is based on epidemiological studies, and in these studies most patients were female, incidence increased with age, and the mechanism of injury was a simple fall to the ground without high-energy trauma.1 Many classification schemes exist to describe distal radius fractures,1,2 and increasingly operative fixation is viewed as the optimal treatment method for restoring anatomic congruity and hence optimal functional outcome,3,4 particularly in the young adult.5

Physicians working at the Whistler Health Care Centre (WHCC) have, of necessity, developed expertise in managing orthopedic injuries due to the numerous skiers, snowboarders and other sporting enthusiasts who visit Whistler every year. This study undertook to follow up patients with displaced distal radius fractures (DDRFs) presenting to the WHCC to determine their

outcome and appropriateness of referral.

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Setting

The WHCC is a diagnostic and treatment facility (D&T) in Whistler, BC, a well-known ski resort town of 9000 residents located 100 km north of Vancouver. The tourist population approaches 40 000 during peak season, and daily skier and snowboarder volumes on adjacent Blackcomb and Whistler mountains reach 25 000; 2.18 million visits were recorded during the 1999–2000 winter season. We treat a unique subset of the population that is young and participates in extreme sporting events that sometimes result in high-energy trauma. There were 23 000 outpatient emergency visits during the 1999–2000 year, with most of these being during the winter season. There are 8 family doctors in 3 separate practices in town. The D&T is staffed by 5 full-time emergency physicians and 4 part-time family physicians. Two of the emergency physicians are CCFP (EM)-certified, one is a CCFP, one is an FRCP (Pediatrics) and one is a GP. The family physicians working part time in the emergency department are CCFP- or GP-qualified.

It is important to note that, while the seasonal employee and tourist population is transient, the physician population is extremely stable. The same doctors who worked here 20 years ago are still here today and are supplemented by the gradual addition of medical manpower as patient volume has increased. The majority live and work in Whistler year round, which also facilitates disaster planning and soliciting extra help when mass casualty incidents arise.

The medical staff at the WHCC have developed expertise in managing a vast array of orthopedic injuries that are conveyed to them by ski patrol, ambulance and helicopter. Whistler has no hospital, no specialist availability except for elective consultations, and no surgical capability. The WHCC functions as a 15-bed emergency department complete with lab, diagnostic x-ray and ultrasound, nursing triage and reception. It is open from 0800 to 2200 hours, and a physician is on call after hours. Physician and nursing staff have become very proficient at employing procedural sedation and intravenous regional blocks to perform the primary orthopedic and plastics care. Twenty-five percent of patients seen live outside Canada, and many Canadian patients are far from home. Most of these patients receive definitive orthopedic care at the WHCC, but many receive emergency treatment and then are referred home for definitive orthopedic surgical care, depending on the clinical scenario (e.g., an injury with neurovascular compromise is referred emergently, whereas an unstable fracture dislocation would be reduced and referred urgently). Many patients requiring definitive surgical care would prefer to receive it at home because of cost considerations, familiarity with their surgeon, and follow-up

considerations, among other things. Therefore, we decided to follow patients with DDRF whom we treated over part of a typical winter season to determine if the treatment and referral instructions that we gave were appropriate to the severity of injury.

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Methods

Charts were collected prospectively from Dec. 1, 1999, to Mar. 31, 2000, by placing a chart copy of any patient with DDRF in a "study box" located at the physician/nursing station. Patients were only included in the study if the treating physician felt their DDRF met criteria for reduction of the fracture. Treatment of DDRF has been the topic for discussion at several continuing medical education rounds that are held regularly at the WHCC. Generally accepted guidelines, described succinctly by Thompson,6 are followed by physicians at the WHCC. Thompson's criteria for reduction were: > 5 mm radial shortening, > 0 degrees of dorsal angulation on the lateral view, > 11 degrees of palmar tilt, > 10 degrees loss of normal (19–29 degrees) radial inclination, and > 2 mm articular surface step deformity.

With such a small group of physicians caring for a relatively large and narrow spectrum of injury, homogeneity of treatment is facilitated. Anesthetic choice and splint or cast material was left to physician preference. Intravenous (IV) regional block (Bier) as described by Roberts7 was used in most cases, with hematoma block and procedural (conscious) sedation used in a few cases. A standard nursing assessment and vital signs form was used on each patient who required procedural sedation and IV regional block. There were no complications or cases of inadequate pain management in any of the 73 reductions. Padded plaster of Paris or fibreglass casts or splints were employed to hold the reduction, and casts were split post-procedure at the physician's discretion. Patients were instructed in cast care, their arms were placed in a high sling, and they were advised to follow up with an orthopedic surgeon where the fracture was felt to be potentially unstable, and with their physician of choice where the fracture was considered to be stable.

Emergent referral was arranged when fractures could not be reduced by closed means or where there were concerns about compartmental or neurovascular compromise. Potential instability was defined by generally accepted criteria, including degree of displacement, comminution, and intra-articular involvement.1 Routine follow-up instructions consisted of weekly re-examination and x-ray for a minimum of 3 weeks from the time of reduction and casting for approximately 6 weeks. The author contacted patients by telephone at 3 months post-injury. The same questions were asked of all patients, including how they would describe their outcome, what and with whom

their actual follow-up was, what their treatment course consisted of, and whether there was surgical treatment required or anticipated.

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Results

The WHCC treated 72 patients with a total of 73 DDRFs (one female skier had bilateral displaced fractures requiring reduction). Ages ranged from 9 to 63 years, with the majority in their teens and twenties. There were 48 males and 24 females involved in 1 walking, 1 hockey, 61 snowboarding and 9 skiing injuries. Anesthetic choice was intravenous regional (Bier) block in 66, hematoma block in 3, and procedural (conscious) sedation in 3 patients. Figure 1 shows how patients were referred for follow-up according to the severity of DDRF.

In 5 patients emergent referral to orthopedics was made for unstable fractures that could not be held reduced by closed methods or where there were concerns about neurovascular compromise. In 27 patients follow-up with orthopedics was advised within 7 days because, although good reductions were achieved, there was concern about potential instability. Of these, 20 (74%) continued conservative treatment. Of the remaining 7 patients, 3 (11%) required surgery and 4 were lost to telephone follow-up. Figures 2 and 3 and Figure 4 show x-ray pictures of DDRF in a 26-year-old snowboarder who was treated with closed reduction and referred for urgent orthopedic follow-up. He was treated "unexpectedly" by conservative means. During his telephone interview he stated his result was good with no problems with stiffness or pain and good strength.

The 3 patients requiring surgery consisted of 1 with external fixation at 3 days, 1 was initially managed conservatively at next-day follow-up but with operative reduction with internal fixation (ORIF) for a slip at 1 week, and 1 with conservative management at 5-day follow-up but with ORIF for a slip at 3 weeks. In 40 patients (56%) routine follow-up was advised because fracture reductions were felt to be stable. Of these, 28 (70%) continued with conservative management. One patient required unpredicted surgery for a dorsal slip at 2-week follow-up. Eleven patients (27%) could not be contacted. The only other patient considering unpredicted surgery was from the "urgent orthopedic referral" group with a possible cartilage problem after 8 weeks of conservative casting.

Chart review and telephone follow-up revealed that 46 (64%) patients received follow-up and ongoing care with orthopedic surgeons, 24 (33%) with GPs and 2 unknown. The 5 patients referred for emergent orthopedic surgery did receive surgery and were not part of the telephone

follow-up group.

Telephone follow-up at approximately 3 months post-injury was successful in 52 of 67 patients (78%). Subjective follow-up information could not be retrieved from 15 (21%) patients because of inaccurate or unlisted phone numbers and/or foreign language barriers; however, in 3 of these patients x-ray results obtained from 2 to 6 weeks follow-up showed anatomic reduction was maintained. Almost all patients had followed discharge instructions very well. Forty-eight (92%) reported a good-to-excellent functional and cosmetic result in terms of appearance, range of motion, pain, stiffness and strength. They were very pleased with the care they had received and with their outcome. Three (6%) patients felt they had a moderate outcome. One of them, who was in the "urgent orthopedic referral" group, failed to obtain physician follow-up until 5-weeks post-reduction, had a dorsal slip and felt the outcome may have been better if discharge instructions had been followed. The second patient took a bad fall at 2 weeks post-reduction (wearing a cast) and required re-reduction. This patient described "moderate stiffness" but was otherwise doing well. Only 1 patient reported her result as "poor." She was getting physiotherapy and considering surgery for "ulnar nerve compression." All reports received from patients were subjective and uncorroborated by objective evidence or professional opinion.

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Discussion

This study of DDRF treated over a 4-month period by primary care physicians at the WHCC suggests that treatment and referral are appropriate for the severity of the fracture and outcomes are generally good.

Most literature regarding distal radius fracture management is based on epidemiological studies involving older patients and low energy trauma.1 Many are orthopedic studies that elucidate classification systems and operative technique.2,4,5 There is a paucity of literature describing management of DDRF in rural settings. An exception is Thompson's article in 1998, which was based on a review of DDRF treated at Sundre Hospital in Sundre, Alta., with recommendations for management and referral of DDRF.6

Most of the DDRFs that we see at the WHCC are the result of high-energy trauma in young, healthy people. Isani and Melone4 stated: "While the majority of unstable fractures can be successfully managed by closed methods, a substantial and increasing number require open treatment for restoration of articular congruity." At the WHCC surgical treatment is not an option, so closed reductions are performed on all patients with DDRF who present to us.

Orthopedic referral is then arranged or suggested based on the severity of fracture and potential for instability or neurovascular compromise. The present study was undertaken to find out if patients' outcomes were satisfactory and whether unexpected surgery was required.

Only 5 patients required emergent orthopedic referral. The majority of patients (55%) were able to have their fractures treated and received routine follow-up. The most surprising finding was that the majority of patients referred for urgent orthopedic follow-up, with potentially unstable fractures, continued conservative treatment and did not require re-reduction or surgery.

Most patients who were referred urgently for potentially unstable fractures were treated conservatively and had good outcomes. While reassuring, this does not change our criteria for urgent referral. It simply gives us confidence in attempting reductions of severe DDRF, referring for appropriate follow-up, and in realizing that our treatment may prove to be definitive.

Sixty-four percent of patients received orthopedic follow-up even when fractures were felt to be stable. This appeared to be due to self-referral patterns, especially in the United States.

The majority of patients were very satisfied with the care they received and with their functional outcome. Unexpected surgery was extremely rare (2 cases). The unexpected dorsal slip at 2 weeks was managed effectively because of the routine follow-up recommendations. The other patient was considering surgery for an ill-defined cartilage problem after 8 weeks of cast treatment.

The study has some limitations. There was potentially incomplete inclusion of all patients with DDRFs treated at WHCC during the study period because we relied on physicians and nurses to photocopy chart copies at the time of treatment and to put them in the study box. During busy shifts this may have been neglected. Telephone follow-up was incomplete (15 patients could not be contacted) and was short-term (3 months), which may not correlate with long-term function. Patients' statements about results and function were subjective and could not be corroborated by professional opinion or objective evidence. And finally, the study findings are specific to the physicians working at the WHCC during that time period and cannot be extrapolated beyond that. However, they do suggest that primary care physicians following generally accepted guidelines for treatment and referral can manage DDRFs effectively.

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Conclusion

Treatment of DDRF by primary care physicians at the WHCC resulted in good outcomes. Indeed, the majority of patients with potentially unstable fractures was managed conservatively and they did well. With appropriate guidelines for treatment and referral, displaced fractures of the distal radius can be managed safely by the primary care physician.

Bruce Mohr, BSc, MD, CCFP(EM), Dip. Sport Med., Chief of Staff, Whistler Health Care Centre, Whistler, BC

Competing interests: None declared.

Correspondence to: Dr. Bruce Mohr, Whistler Health Care Centre, 4380 Lorimer Rd.,Whistler BC V0N 1B4; bmohr@whooshnet.com

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