Orthopaedic trauma care during a pandemic: initial responses in the United States and Canada

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Abstract
As in other countries, COVID-19 had a significant impact on the delivery of Orthopaedic trauma care in North America. Both Canada and the United States had similar experiences and responses to the pandemic, while the burden of disease was significantly greater in the United States. There was significant uncertainty in the early phases of the pandemic, fueled by a lack of knowledge of the pathophysiology and spread of COVID-19, questions surrounding screening protocols, lack of guidelines for managing infected patients, and concern over limited supplies of personal protective equipment. As we gained knowledge and experience, changes were implemented to optimize the delivery of trauma care, some of which may have lasting effects. In this article, we share the experiences and lessons learned in Canada and the United States in response to the pandemic.

Keywords: Canada, coronavirus, COVID-19, pandemic, trauma, United States

1. Introduction
The coronavirus disease COVID-19 was first becoming a global concern in the latter months of 2019. On January 30, 2020 the World Health Organization declared the outbreak a Public Health Emergency of International Concern, warning that all countries should be prepared for containment.\textsuperscript{[1]} While the world focused on the Wuhan region of China, both the Canadian and American governments began discussing preliminary containment strategies and contingencies. The first confirmed cases of COVID-19 in the United States (US) and Canada were documented on January the 21st and January the 25th respectively.\textsuperscript{[1,2]} In each of these situations, the individuals had recently traveled to North America from Wuhan. On February 2, the US enacted travel restrictions from China, and the next day declared a public health emergency.\textsuperscript{[3]}

As it became more apparent that basic containment measures were inadequate, the World Health Organization declared COVID-19 a global pandemic on March 11, 2020.\textsuperscript{[1]} The Canadian and American responses to travel were similar over the subsequent days. While there were provincial and state-based differences in Canada and the US respectively, there was a general progression to “lock-down” in the 2 countries. There were interprovincial travel bans in Canada, while California became the first of the states to issue a statewide stay-at-home order on March 19.\textsuperscript{[3]} Any travel was limited to “essential” workers and shopping for basic necessities.

While there were significant successes in limiting COVID-19’s reach, the pandemic continued to spread. In the US and Canada alike, there were “hot-spots” of disease prevalence. In the US, major metropolitan centers such as Los Angeles, New York City, and New Orleans bore much of the burden of disease. More densely populated provinces in Canada were hardest hit as well with Quebec and Ontario bearing the brunt. At the time of final preparation of this manuscript, November 28, 2020, there were over 12 million cases and 260,000 deaths in the US and 353,000 cases and 11,800 deaths in Canada.\textsuperscript{[4]}

2. Organizational actions to trauma services
While organizational differences in the US and Canada exist, the delivery of orthopaedic trauma care is quite similar between the North American neighbors. The common theme of uncertainty was an underlying theme throughout health care systems initially. Availability of personal protective equipment (PPE), accuracy and availability of testing, knowledge of the pathophysiology and spread of COVID-19, best practices for protecting both patients and providers, and the best methodologies for managing infected orthopaedic trauma patients all contributed to the sense of unease in our facilities. Due to these many questions, most hospitals adopted “zero visitor” policies with the exception of some maternity situations and pediatric patients.

Almost all elective procedures were postponed or cancelled. Inefficiencies in screening and frequent changes in local and regional policies caused delays in time-sensitive cancer procedures. Emergent procedures were even impacted with concerns...
over screening delays and issues with methods of anesthesia delivery. Fortunately, the effects of these operational issues on trauma care delivery were muted to some extent secondary to decreased trauma burdens secondary to decreased travel and shelter-in-place orders in both the US and Canada.

In attempts to protect both access to care, as well as the providers themselves, many orthopaedic trauma services modified their approaches by dividing workload into separate teams. Teams were created to keep key members of the orthopaedic trauma service isolated from one another in the event of an exposure or COVID-19 infection.

3. Effect on clinical care delivery

Several aspects of care delivery were significantly impacted. Management of some injuries with more “relative” indications such as clavicle, humeral shaft, and distal radius fractures seemed to see an increase in nonsurgical management. The effects on outcomes remain to be seen, but it appears at this point that reports of significant adverse outcomes have been minimal.

Most institutions developed algorithms based on elective, urgent, and emergent categories. Elective cases were initially postponed. Urgent cases were divided into those cases where waiting for COVID-19 testing was reasonable or not. Emergent cases and urgent/emergent cases generally were allowed to proceed with added precautions of dedicated negative flow operative theaters, anesthetic techniques, added PPE, and patient transportation techniques.

As we learned more about the virus, it was identified that infected patients undergoing surgical procedures were placed at even higher risk. Screening procedures were implemented, not only to protect health care staff, but also to reduce the risk of harm to patients. Eventually, elective surgeries resumed, with the implementation of additional screening measures, and when appropriate, preoperative testing.

On March 17, the Centers for Medicare Services removed many of the pre-existing hurdles to telemedicine and virtual office visits with the intention of minimizing patient and health care providers alike to the risk of COVID-19 exposure. Similar relaxations in Canada have led to a considerable increase in the number of virtual follow-up visits for fracture care via Zoom, FaceTime, and other electronic communication tools. As the efficacy and patient safety of these methodologies is determined with greater follow-up, it is possible that this could be a cost-savings benefit to our health care delivery systems secondary to fewer x-rays, in-office physical visits, transportation costs, and other unforeseen aspects of utilization.

4. Lessons learned

Generally, it appears that 2 primary areas of concern and potential improvement lie in supply chain and systems areas. The sharp spike in demand for PPE, ventilators, appropriate supplies of testing kits, and reagents was an immediate challenge. Moving forward, improved stockpiles of many of these items will be necessary to avoid delays in the delivery to hospitals and health care teams on short notice. Vaccine distribution will hopefully be the next distribution challenge to test the supply chain.

Systems-based opportunities exist at local, regional, state/ provincial, and federal levels in both the US and Canada. Improved protocols at all levels must be implemented and understood, similar to our efforts to be prepared for mass casualties, natural disasters, etc. Utilization of technological advances for telemedicine has already created changes in our delivery systems that are likely to have lasting effects on the delivery of health care in the future.

References