



Viewpoint

Total joint arthroplasty in the public hospitals of Port-au-Prince, Haiti: our experience

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In December 2018, we participated in a surgical mission trip to Port-au-Prince, Haiti. The team consisted of a fellowship-trained arthroplasty surgeon, a chief orthopaedic resident pursuing fellowship training in arthroplasty, an anesthesiologist, a surgical technologist, and an implant representative. Our goal was to set the foundation upon which a sustainable, modern, arthroplasty program in two of the public hospitals in Port-au-Prince could be built. Here, we present our experience, lessons learned, and goals for future program growth.

Since the 2010 earthquake leveled Port-au-Prince, many nongovernmental organizations (NGOs) from all over the world have established health missions to Haiti, totaling \$13.8 billion in foreign aid [1]. However, the resource allocation for health care in Haiti in the fiscal year 2016–2017 was only 4.5% of the total government budget [2,3], or roughly \$13 per capita per annum, well below the average for low-income countries [4]. Despite the large amount of foreign aid, pervasive poverty and lack of infrastructure,

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coupled with the high burden of chronic disease [5], make providing appropriate medical and surgical care extremely challenging.

The resounding success of Operation Walk (Torrance, CA) has demonstrated the enormous benefit that hip and knee replacement can bring to the developing world, but it has also shown that such a large endeavor requires a large team of surgeons and ancillary staff, extensive fundraising, and cooperation with local government, hospitals, and physicians to be effective. No organization has yet established a dedicated and specific arthroplasty mission in Haiti, limited by lack of funding, intermittent civil unrest, obstacles at customs, and pockets of corruption within the Ministry of Health.

Orthopaedic NGOs have provided surgical care for patients in Haiti, especially since the earthquake in 2010, but their presence has created new issues. According to Nau et al., “by providing free care for all and providing extremely low wages for doctors, in combination with the country’s political, social, and economic instabilities, we believe these NGOs are driving many well-trained surgeons out of the country and out of the profession in search of a better life in the United States or elsewhere.” The public hospitals, Hôpital de l’Université d’Etat d’Haiti (HUEH) and Hôpital Universitaire de la Paix (HUP), are hit hardest, with most of the orthopaedic residency graduates who stay in Haiti choosing to practice in the private sector, if they can find jobs. Of the 19 residents who graduated in 2016 from all three residency programs, 68% are not practicing orthopaedics in Haiti; 7 have left or are trying to leave the country, and 6 are unemployed [2].

We partnered with an NGO called Orthopaedic Relief Services International (ORSI) (For more information about ORSI, please contact Ronald Israelski, M.D., risra42@hvc.rr.com), which has made regular trips to Haiti since the 2010 earthquake and has a relationship with the residency programs at both HUEH and HUP. We decided to begin with cemented bipolar hip hemiarthroplasty to treat displaced femoral neck fractures in elderly patients. We chose cemented stems because, besides the excellent survivorship record [6], we felt that using cement allows for secure stem fixation without a perfectly sized implant, which we felt would be prudent in a place with limited implant supply. Also, we felt that the use of cement would lessen the chance of intraoperative fracture, which was critically important, as fracture fixation may require implants or instruments that were not available.

Our trip, thus, had three goals. First, we wanted to provide modern arthroplasty care for elderly patients with displaced femoral neck fractures. In the public hospitals, the current standard of care for these patients requires family members to purchase an Austin-Moore hemiarthroplasty stem from a medical supply store. The cost for this implant ranges from \$800–\$1000, which is an enormous cost in a country where the annual per capita income was \$694 in 2016 [7] and far exceeds the cost of the same implant in other parts of the world. Minimal preoperative medical workup is done, and there are very few staff members to provide patient care on the wards; patient families bear the responsibility for bathing, toileting, food service, and physical therapy. If the family cannot afford the implant, the patient is treated nonoperatively for these femoral neck fractures. Treatment options for young patients who develop posttraumatic arthritis or osteonecrosis of the hip are almost nonexistent.

Treatment sustainability was our second goal. Rather than contributing to the existing problem of foreign surgeons taking work from local surgeons, we planned to leave behind streamlined instrument trays and several implants, so that they may be used by residents at both public hospitals for patient care. We wrote up a simplified operative protocol for cemented hemiarthroplasty to leave with the residents and streamlined the surgical instruments to match the protocol.

Finally, we wanted to focus specifically on resident education. Historically, Haitian orthopaedic surgeons have completed fellowships in the United States or Europe, and then have returned to train the next generation of Haitian orthopaedic residents. It is currently very difficult for Haitian orthopaedic residency graduates to obtain fellowship training abroad due to the increasing competitiveness of the fellowship match and the often inconsistent level of training among the Haitian residents, which may not be on par with their peers from developed nations. We chose to start with a relatively simple procedure, spend time on didactic sessions, and teach them how to use the instrumentation system. Residents at HUEH and HUP are not being trained in modern orthopaedic surgery techniques because the hospitals lack basic, but necessary, resources to do so. Besides teaching them how to provide better patient care in the short term, we hoped that our time there can help prepare them better for postgraduate training abroad.

Through ORSI, we worked with the residents at both hospitals to select possible cases in advance. On our first day, we rounded with the residents at both hospitals to meet and indicate the patients (Fig. 1). We started by giving a lecture to the orthopaedic residents on the basic principles of modern hip arthroplasty, including templating, cement technique, reduction of dislocated total hip arthroplasties (posterior and anterior), and removal of implants for infection (Fig. 2). During the first case at each site, the visiting attending surgeon (R.S.) narrated the case while the US resident (J.H.) acted as a lead surgeon to teach the Haitian residents through the case. Haitian residents participated in all subsequent cases according to a graduated responsibility model (Fig. 3).

It is worth noting that we were fortunate to have an implant representative who volunteered to join us on the trip. It was enormously helpful to have him there to ensure that the cases ran smoothly, especially as our team did not include a circulating nurse. Although it is unlikely that an implant company would dispatch a representative to a country where implants are being donated for humanitarian missions, we thought it would be helpful to have someone there to help explain the instruments and implants in detail to the residents. We wanted to give the residents every possible opportunity to understand the instrumentation so that they can use and maintain the trays themselves.

The patients we treated ranged in age from 70 to 88 years, included 5 displaced femoral neck fractures and one intertrochanteric femur fracture, and time from injury to surgery ranged from 6 weeks



Figure 1. Team leader (R.S.) reviewing radiograph with residents.

to 3 months. All received spinal anesthesia without sedation, which was administered by our anesthesiologist with the assistance of Haitian anesthesia residents. The cases proceeded without intra-operative incident. There were several unanticipated challenges, mostly related to the lack of everyday efficiencies to which we are accustomed in even the most outdated operating rooms in the United States. The autoclave machines were small and arcane, worked intermittently, and had no sterile wrappings or tape, so we improvised and wrapped the trays with sheets. Suction worked intermittently. We brought electrocautery pens with us, but did not bring grounding pads, so we had to make do with reusing a single grounding pad on every patient. We also used rongeurs to “re-cut” the femoral necks because we felt it would be useful to teach the residents another way to make a neck cut without a battery-operated saws, as electrical power is inconsistent, unsterile, and sometimes nonexistent.



Figure 2. Team leader (R.S.) teaching residents at Hôpital de la Université d'Etat d'Haiti (HUEH) how to reduce a dislocated hip.



Figure 3. Visiting surgeons (R.S., J.H.) teaching residents in the operating room at Hôpital Universitaire de la Paix (HUP).

All our patients were able to get up and ambulate the next day with assistance, some for the first time in months. We received positive feedback from the residents about the week; they felt like they had learned enough to do a cemented hemiarthroplasty on their own. We left the implants and trays in the care of an ORSI advisory board member who lives outside Port-au-Prince so that they would be available to residents at both hospitals when needed.

We anticipate returning to Haiti over the coming years and building on this first mission. Specifically, we would like to see the postoperative patients from previous trips for follow-up so that the residents can learn about the expected recovery after hip arthroplasty and the potential complications. A logical next step would be to teach total hip arthroplasty, as it would allow the residents to better treat patients with osteonecrosis and collapse, posttraumatic arthritis, and mild acetabular dysplasia. Depending on the availability of donated implants, we would likely begin with cemented polyethylene cups and teach the use of cement and screws to make rebar augments as needed.

With increased utilization of arthroplasty, however, the rate of complications will increase, and it will become extremely important to educate the Haitian residents on effective management. Treating common problems such as periprosthetic joint infection, periprosthetic fractures, implant malposition, and aseptic loosening will require additional instrumentation, which can be difficult to obtain, especially in a time-sensitive manner. In addition, local surgeons may not be familiar with these less commonly used techniques, which places both patients and surgeons in potentially dangerous situations. There have been very few reports of complications related to cases done on arthroplasty mission trips [8], but it may not be accurate to extrapolate this rate to our population. As we undertake further missions, it will be necessary to track patient outcomes and complications and

provide education and equipment for management as needed. We also plan to establish communication channels for mentoring. We would like to be available to answer questions or provide guidance to the Haitian residents, especially as they begin to take on more difficult cases. Should the complication rate exceed a level that can be reasonably be addressed by local surgeons, we will have to discuss with local orthopaedic leadership the ethics of pursuing this program further [9].

Although it is resource intensive, we believe that establishing this program will help orthopaedics in Haiti move forward by exposing residents to more modern surgical techniques, instruments, and implants and will also lessen the substantial disease burden imposed by end-stage arthropathy and femoral neck fractures. In order for this program to be successful, more work must be done with ORSI to establish and oversee support for departments within the public hospitals, such as nursing, sterile processing, and biomedical engineering to help surgery and recovery proceed as smoothly as possible. An arthroplasty program would benefit from central governance (ideally at HUEH and at HUP individually, rather than one to administer both sites) for management of implants and equipment, as it is not currently safe to store them at either hospital site.

Today in Port-au-Prince, reminders of the earthquake are everywhere throughout the hospitals: cracks in the floor, crooked doors hanging off hinges, and intermittently working plumbing and electricity. It devastated the city and the public health-care system, and there is still a long way to go before modern orthopaedic care is feasible in Haiti. In the meantime, NGOs must work together with Haitian surgeons and government officials to better serve the needs of orthopaedic patients, rather than take cases away from the local surgeons. As volunteers, it is our responsibility to train Haitian orthopaedic residents and provide them with the necessary skills, resources, and support to stand on their own.

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