Surgical and Teaching Mission to Mongolia: Experience and Lessons

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BACKGROUND: **For decades, the disparity in medical care across the world along with the fundamental essence of medicine as service has laid the foundation for the global medical mission. Mongolia, a country often overlooked as an area in need of medical aid, harbors a fertile environment for long-term change. In the last 15–20 years, after the fall of the Union of Soviet Socialist Republics, Mongolia has turned to a free-market healthcare model and has been struggling with the transition from the formally state-run system. These changes have slowed the original progress noted among surgical specialties, namely neurosurgery, in Mongolia. A lack of resources, a desire for international interaction, and a need for technical mentorship remain a real struggle for local neurosurgeons.**

METHODS: **Under the auspices of the Virtue Foundation (www.virtuefoundation.org), we report on our 3-year experiences during our surgical and teaching mission to Mongolia and look towards long-term improvements in Mongolian neurosurgery.**

RESULTS: **A total of 15 operations were performed and more than 50 patients seen in clinic during the 3-year experience. Patients ranged from 1 to 77 years of age. No patients encountered any significant peri- or postoperative complications.**

CONCLUSIONS: **In our experience with the surgical and teaching mission to Mongolia, when directed appropriately, medical missions can serve as the perfect medium in fostering that environment, providing local healthcare professionals with the knowledge, skills, and motivation to create self-sustaining improvement in their own country, hence promoting intellectual and technological advancement and raising the standard of care.**

INTRODUCTION

For decades, the disparity in medical care across the world along with the fundamental nature of medicine as service has laid the foundation for global medical and surgical missions. Each year, there are hundreds of medical professionals who travel thousands of miles across the world to provide medical attention to areas with underdeveloped healthcare infrastructures. In addition to direct healthcare provision, however, these missions also can supply a much greater need in the global scheme: the spread of medical knowledge, technology, and international collaboration.[1-4]

Although the direct effect of these trips often is measured in the number of patients treated or the number of surgeries performed, integration of local medical and healthcare personnel into these missions is key in sowing long-term progress. Without the latter, these countries and regions can only be expected to return to the same struggles, experiencing long stretches of difficulty while waiting for the next mission to arrive.[5-7] Although the altruistic nature of medical missions will continue to motivate the cause, we feel that the true success of these missions is in long-term changes they create in the host countries. In cooperation with the independent nonprofit organization Virtue Foundation (www.virtuefoundation.org), we report here our experience during 3 surgical and teaching missions to Mongolia in 2014, 2015, and 2016.

HEALTHCARE IN MONGOLIA

To cultivate long-lasting relations and initiate lasting changes, it is imperative to identify a mission site that fulfills several criteria. True need is most imperative, but a minimal social and political

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- Global health
- Medical mission
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foundation is a sine qua non for a successful enterprise. Mongolia, a country often overlooked as an area in need of medical aid, proved ideal. Healthcare in Mongolia has undergone a tumultuous change in the last several decades. In 1911, Mongolia declared independence after 220 years of Chinese rule only to fall under Soviet control in 1924 as a satellite communist state. This brought exposure to models of governance, healthcare, and public service. Under the strong financial and intellectual influence of the Union of Soviet Socialist Republics in its formative years, healthcare was accepted as a public responsibility from the inception of the communist country. The first civil hospital was established in 1925. Soviet medical research and development teams during the next 10–15 years introduced modern medicine to Mongolia. By the 1970s the country had established a well-developed, centralized system through which patients in rural areas could be referred into national centers for evaluation and treatment. The Soviet Union provided a large portion of the financial support for this centralized, bureaucratic public health sector. The fall of the Union of Soviet Socialist Republics in the 1990s resulted in an abrupt halt to this aid, crippling the Mongolian healthcare system. During the last 15–20 years, Mongolia started the process to transition to a free-market healthcare model, with all the struggles associated with departing from a formally state-run system.[8-11]

Although these relatively recent changes have fostered the need for medical aid in Mongolia, a variety of other factors are essential for true long-lasting transformation of the healthcare logistics in any country. The success or failure of any short-term surgical mission hinges on a rigorous site selection, taking into consideration that not only the healthcare, but also the political and socioeconomic environment serve as the foundation for a developing relationship.[12-14] Political stability and rule of law are indispensable to create a minimal political framework to protect the rights of patients and physicians and to maintain and implement hard-won changes while preventing corruption and mismanagement. History has shown us that humanitarian aid in regions lacking this stability can significantly suffer and bring about more harm than good.[15]

The Rule of Law Index is an annual report prepared by the World Justice Project. It examines the state of the rule of law in a given nation by using 47 indicators around the following themes: constrains on government power, absence of corruption, open government, fundamental rights, order and security, regulatory enforcement, civil justice, and informal justice. In the 2016 Index, Mongolia ranks 55th globally (of 113 countries), performing well among its peers of lower-middle income countries, with excellent scores in civil and criminal justice protection of fundamental rights, order and security, and press freedom. It ranks lower in corruption, especially in legislature, and influence of powerful interest groups in government. These data, along with the fact that the country's global ranking has increased since the World Justice Project 2015 Rule of Law Index, further supports that Mongolia invests in continued improvement and is a solid candidate to establish lasting change (Figure 1).[16]

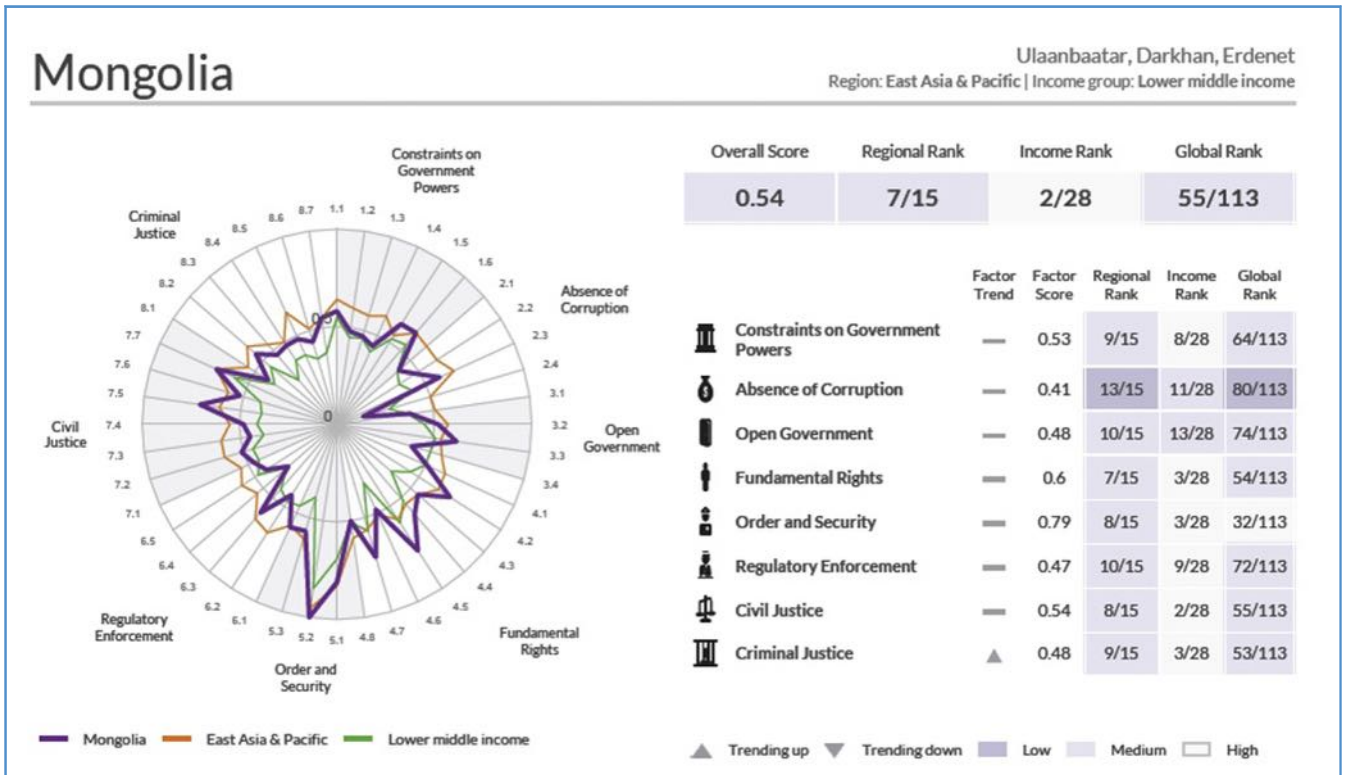

Figure 1. Rule of Law Index 2016—Mongolia. Image obtained from publicly released report accessible at: http://worldjusticeproject.org/rule-of-law-index. Copyright 2016 by the World Justice Project.

In addition, baseline healthcare infrastructures have to exist for any external organization to build and assist in the improvement of these preexisting logistics. Although the fall of the Soviet Union slowed Mongolian healthcare to a relative economic and technological standstill, its original influence on the country provided essential infrastructures to the system. The presence of hospital and surgical facilities, standards of sterility, and emergency services allow healthcare professionals in Mongolia to build on these basic infrastructures. Lastly, a relatively young population and a future-oriented mindset among the many young healthcare professionals serve as fertile soil in which to cultivate ideas and strategies of improvement progress and change.[17]

SCOPE OF MONGOLIAN NEUROSURGERY AND THE NEED FOR ASSISTANCE

Modern neurosurgery in the Mongolian Republic dates to 1971 with the development of the first neurosurgical unit. The first Department of Neurosurgery was set up with 25 beds at the Third Central Hospital (Shastin Central Hospital) in the capital city of Ulaanbaatar. The development of centralized training, research, and clinical practice of neurosurgery in Mongolia at the time was possible largely secondary to assistance from neurosurgical specialists from the Soviet Union and its satellites. Most of the early neurosurgeons traveled to Eastern Europe to receive further training, bringing back what they learned to their home country.[18]

With the advent of a residency-training program at the Shastin Central Hospital, Mongolian neurosurgery was able to pass these teachings on to future generations. After completing medical school and attending an approximately 3-year training in general surgery, interested residents can proceed, if chosen, to complete their subspecialized training in the neurosurgical residency. This program lasts approximately another 3 years and involves training under the Department of Neurosurgery in Ulaanbaatar as well as rotations to rural hospitals in the countryside.

Once their formal training is complete, junior neurosurgeons are considered to be practicing for a probationary period, during which they must operate under the supervision of one of the senior surgeons. Many neurosurgery residents and junior surgeons find themselves having to travel to Europe or Eastern Asia to broaden their experience and skills at more modernized and globally driven centers. As the once sufficient intellectual and financial support of the Soviet Union faded away, Mongolian neurosurgery saw a slowing to the pace of progress, as did much of Mongolian healthcare. Out of this framework, local neurosurgeons now find themselves having to seek their own sources of learning and support if they ever hope to advance the field and provide better care for their patients.

The surgical and teaching mission to Mongolia was organized by the Virtue Foundation, a nonprofit organization with Special Consultative Status to the United Nations that primarily is composed of volunteers. The Virtue Foundation's mission is to increase awareness, inspire action, and render assistance through healthcare, education, and empowerment initiatives. The healthcare program aims at developing a standard-of-care model for local physicians and surgeons via education, clinical/surgical guidance, and resource allocation. Through previous trips to Mongolia, the Virtue Foundation had cultivated a working relationship with local healthcare professionals; these connections resulted in the request to the foundation for further collaboration and laid the foundation for neurosurgery to expand the scope of its mission there.

Organization began roughly 4–5 months before the scheduled mission date each year, and each team was responsible individually for coordinating supplies, travel documents, immunizations, and any other practical details before the trip. Also of consideration were the large number of surgical supplies/equipment that would be transported in and out of the country. Direct collaboration with the local physicians and hospital administration was central to streamlining the Mongolian customs process on arrival as well as in maintaining an accurate inventory of equipment, both those to be donated and those to be brought back to the United States with the surgical team.

FORUM FOR KNOWLEDGE TRANSFER

Intellectual correspondence and debate are crucial to promoting advancement in the medical and surgical subspecialties. Weekly interdepartmental conferences including neuropathologists, neuroradiologists, and neurologists in addition to the neurosurgery team make up the primary forum for case based debate and discussion. These meetings allow junior surgeons and residents to consult senior members of the department about patients seen over the previous days and allow for all the clinical teams to plan a multidisciplinary approach to the patient. Unfortunately, this occurs within the singular entity that is the Department of Neurosurgery at the Shastin Central Hospital: the lack of any other academic centers in the country severely limits the forum for knowledge transfer.

In efforts to broaden their learning and exposure to new advancements and developments in neurosurgery, many of the junior surgeons and residents travel to European or Asian countries for observerships and mentorships; however, the importance of a local environment of scholarship, communication, exchange and debate of new treatment paradigms, modern surgical techniques, and research cannot be understated. This provides a more immediate benefit and improvement in patient care to the Mongolian public and also develops a greater sense of national pride among younger surgeons who are determined to seeing improvements brought to their country. Given the strong national infrastructure and technological access, most Mongolian neurosurgeons and residents in training are able to access a wide range of neurosurgical literature. Nevertheless, there is a need for mentorship among many of the local junior surgeons that cannot be filled by textbooks and journal articles. Surgical missions fill this niche to cultivate relationships and connections that allow for continued discussion, correspondence, and debate even well after the mission is finalized. This goal has to be specifically addressed by any surgical mission for true progress to be achieved and maintained.

With this in mind, the surgical and teaching mission to Mongolia incorporated a neurosurgical clinic while in Ulaanbaatar to create an open forum for case-by-case discussion about diagnosis, treatment, prognosis, and complications among the mission and local neurosurgeons. The local surgeons screened each patient and formulated a plan of care. This maintained the

autonomy of the local surgeons and fostered a sense of trust with the mission surgeon. Review of the case, imaging, and patient by the mission surgeon then allowed for open discussion and debate. In several cases, because of their limited access to technology and alternative treatment modalities, the local surgeons were exposed to a new way of approaching a problem in a given a patient, furthering their understanding of the disease process itself.

ADVANCING NEUROSURGICAL TECHNOLOGIES IN MONGOLIA

A continued obstacle to the advancement of any surgical subspecialty in a developing country is access to new and adequate technologies. Currently, the majority of funding and resource support for the Neurosurgical Department in Ulaanbaatar is through the Ministry of Health, which then is further subdivided across departments by hospital administration. Although this system provides for the care of the nation's sick on a grand scheme, it is insufficient to support the advancement and progress of complex and technology-driven specialties such as neurosurgery. In this setting, local neurosurgeons have developed mechanisms to cope with the lack of technological resources. However, the lack of resources burdens the system and limits the surgeon's ability to treat his patients at an accepted standard of care. Items taken for granted in most Western hospitals, such as appropriate needle-drivers, suction drains, adequate surgical lighting, and anesthesia ventilators and monitors or operative tables, are all missing from the neurosurgical operating theaters at the Shastin Central Hospital (Figure 2). This affects patient care directly as well. Local neurosurgeons find themselves having to defer standard of care treatments during surgery, such as spinal fusions, because limitations of the hospital or the patient to provide the funds to purchase necessary instrumentation and/or implants.

Interestingly, as the mission team discovered while operating with the local neurosurgical team, there were many state-of-the-art technologies and facilities available for the surgical subspecialties, most often, however, through donations or contributions from the nongovernment organizations. For example, the Department of Cardio-Thoracic Surgery had an angiography suit with the latest biplane set up. Although limited in its scope, the surgical and teaching mission, with its nonbinding industry support, created a platform over which to provide many of these needed resources to the Department of Neurosurgery at Shastin Central Hospital.

Figure 2. Neurosurgical procedures proceed on a daily basis at Shastin Central Hospital with limited resources.

From equipment such as surgical disposables, to operating headlights, to implantable devices such as ventricular shunts, the mission took efforts to close the gap in the need for resources. In addition, creating new relationships between local neurosurgeons and industry laid a framework for future charitable donations. Long-term improvements in this sector, however, cannot be maintained adequately solely on a charitable basis. With the help of international teams such as ours, local neurosurgeons are making strong arguments at the Ministry of Health for improved resource allocation and technological advancement for the care of their population.

SURGICAL MENTORSHIP IN MONGOLIA

As with any technical skill, in neurosurgery, practice makes perfect. Although theoretical knowledge and clinical experience are important factors, the need to apply the technical know-how and actually operate is invaluable for residents. Although they were exposed to a variety of neurosurgical cases, the nuances of surgical technique and exposure to a wider range of surgical instruments and equipment was key to motivating and educating the young surgeons at Shastin Central Hospital. Focusing on quality rather than quantity, the neurosurgical team performed a total of 4 neurosurgical cases in 2014, 5 surgeries in 2015, and 6 cases the following year during their individual 1-week mission (Table 1). Each case had been screened by the local surgeons and selected for their potential as both learning opportunities for the local team as well as for their complexity requiring a multidisciplinary approach not available at the Shastin Central Hospital. At our hosts' request, we concentrated on technically challenging cases, including congenital pathologies and spinal oncology cases. Once on site, our surgical team, together with local neurosurgeons, reevaluated previously selected patients in clinic. Patients already had been made aware by the local team of our presence and they were in agreement of our joint care with the local neurosurgical team.

Clinic was attended by our team of neurosurgeons from the Virtue Foundation, local neurosurgeons, and a local nurse on the neurosurgical staff. The local neurosurgeons and nurses led the interview, providing translation services for our team, and physical consent was obtained in the local language and according to the guidelines of the local hospital administration, including consent for registering and storing patient information in our database. In addition to the practical purpose of the clinic to evaluate surgical patients preoperatively, it also served an educational role for the local neurosurgeons. Cases for which surgery was not recommended fell into 2 primary categories: 1) those that did not require surgical intervention but rather could be treated medically or observed; and 2) those that would have required a surgery that could not be done with the available resources or where the complexity of the surgery and/or postoperative care exceeded the existing infrastructures and expertise (such as necessary instrumentation, implants or even surgical beds for lumbar spine procedures).

During the process, a detailed database was maintained that included patients' medical history, photographs, history of present illness, along with treatment plan developed at the time of the visit. The database is shared with other surgical subspecialties from the

Table 1. Surgical Case Index for the Surgical and Teaching Mission to Mongolia: 2014–2016

Mission Year	Age	Sex	Presentation	Diagnosis	Treatment
2014	58	F	Leg weakness	T1-2 intradural extramedullary tumor	T1-2 laminectomy and resection of tumor
	63	M	Gait instability and loss of dexterity	C4-5 herniated disc with cord compression	C4-5 ACDF
	52	F	Gait instability and sensory changes	Chiari malformation with syrinx	Suboccipital craniectomy with C1 laminectomy and pericranial graft
	36	M	Diplopia and exophthalmos	Intraorbital tumor with orbital roof erosion	Resection of tumor with orbital roof reconstruction
2015	16	M	Seizures and nasal deformity	Sincipital encephalocele	Bifrontal craniotomy for encephalocele repair
	24	F	Neck stiffness and head tilt	Torticollis	Unilateral sternocleidomastoid release
	2	M	Enlarging nasal deformity	Sincipital encephalocele	Bifrontal craniotomy for encephalocele repair
	70	F	Back pain and enlarging growth of previous tumor	Thoracic parasagittal chondroma	Resection of recurrent thoracolumbar chondroma with latissimus dorsi flap
	57	F	Gait instability and lower extremity weakness	C7 plasmacytoma with progressive kyphosis	C7 corpectomy
2016	7	M	Enlarging nasal/forehead deformity	Sincipital encephalocele	Bifrontal craniotomy for encephalocele repair
	77	M	Finger pain and numbness	Cervical spine stenosis	C3-5 laminectomy and C3-6 posterior instrumentation and fusion
	39	F	Bony erosion by prior mass	Infiltrative residual intraorbital mass	Orbital rim–sparing resection of tumor with orbital roof reconstruction
	26	M	Forehead deformity	Frontal sinus mucocele	Reconstruction of right frontal deformity with excision of mucocele
	57	M	Headache with right arm and leg clumsiness	Chiari malformation with syrinx	Suboccipital craniectomy
	1	F	Sacral swelling	Coccygeal mass with local invasion	Resection of coccygeal mass

F, female; ACDF, anterior cervical discectomy and fusion; M, male.

Virtue Foundation and with local neurosurgeons for improved record keeping. Selected operative cases for the mission were identified, and a separate database maintained describing the nature of the surgery, operative course and further postoperative plan.

Across the 3 trips, an average of 20 patients were evaluated in clinic on each visit and diagnoses ranging from plagiocephaly, Dandy-Walker malformations, vertigo and lumbar spondylolisthesis, to torticollis, orbital groove meningioma, and trauma-related spinal and facial injuries. During our trips, we operated on a total of 3 complex pediatric frontonasal encephaloceles. Although encephaloceles are seen commonly in the Asian, South Asian, and Eastern Asian populations, the complicated reconstructions needed for these children (3, 7, and 15 years of age) required a multidisciplinary approach (**Figure 3**). The delayed nature for the treatment to address these congenital defects added to the complexity and mandated a careful examination and determination of the surgical planning.

Before we traveled to Mongolia, the details of these cases were evaluated and discussed by the local neurosurgeons and the mission team. Although the local team was in charge of obtaining 3-dimensional reconstructed computed tomography scans, the neurosurgery team reached out to the plastics and otorhinolaryngology team involved in the mission to delineate a surgical plan and coordinate the individual contributions for these complex surgeries. In one case, a medical model of the patient's skull was made to better understand the underlying defect and devise a surgical plan. This preparation, although time consuming due to the logistics of communication and organization, was essential to providing an optimized treatment plan. In Mongolia, local surgeons were instructed on microsurgical techniques for resection of the encephalocele, cosmetic approaches to repairing these defects, and skull defect reconstruction techniques, among other surgical technicalities.

The focus around spine cases gravitated towards spinal oncology. Several spinal oncology cases were undertaken during the 3 trips. Two cases are presented herein. The first involved a middle-aged woman who had been treated previously for an expansive chondroma of the thoracolumbar spine. Initially resected from the lumbar spine to decompress the spinal cord, this locally aggressive variant of the tumor recurred and expanded to the thoracic spine and the patient underwent a gross total resection 3 years after the original surgery. Now, 2 years later, and without the means to provide postoperative adjuvant treatment, the disease had progressed from the original location higher into the thoracic spine, involving the paraspinal muscles bilaterally, the latissimus dorsi on the left, and the posterior elements without invading the canal and then expanding to the left psoas in the retroperitoneal space (**Figure 4**). In addition, the tumor was now protruding through the musculature and soft tissue of the back, covered by only a thin layer of skin. Involving the collaboration of teams from the United States, Israel, France, and Mongolia, the patient underwent a near total

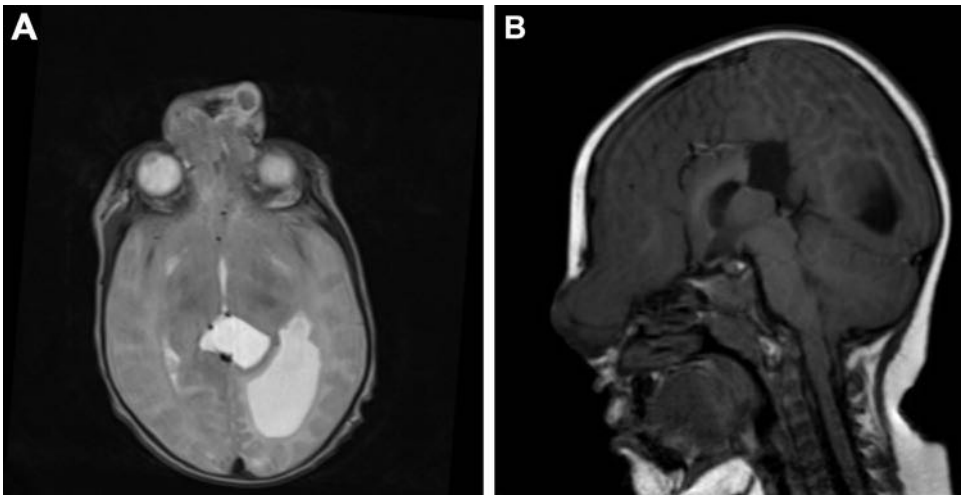

Figure 3. T2-weighted axial (**A**) and T1-weighted (**B**) sagittal magnetic resonance image of sincipital encephalocele in 3-year-old patient treated in 2015.

resection of the tumor with rotational muscle flap closure. Her care was furthered postoperatively with consultation and recommendation to seek out possible proton beam centers in Asia for further radiation therapy, which was coordinated with the radiation therapy team in New York.

The second oncologic spine case involved a lady with plasmacytoma who after an acute spinal cord compression underwent a posterior laminectomy by the local team. One year later she progressed with a pathological fracture at C_5 but without access to instrumentation her case was treated conservatively (Figure 5). Although the standard of care may involve radiation and chemotherapy, this was another case in which a lack of resources prevented patients from obtaining the required care both surgically and medically. The patient underwent decompression and corrective fixation to address the canal compromise and the kyphotic deformity. Although our host surgeons may have travelled to other countries to participate in such cases, the ability to have it coordinated with the local operating room staff and hospital team was crucial to cultivating a culture of improvement and advancement amongst the local personnel.

BROADENING THE SCOPE OF NEUROANESTHESIA IN MONGOLIA

Successful neurosurgical procedures are just as dependent on the surgeon and technology as they are on the anesthesiologist. The same obstacles that rose for neurosurgery afflicted anesthesiology in Mongolia over the last several decades: from our experience from our first visit to the Shastin Central Hospital, we knew that only one

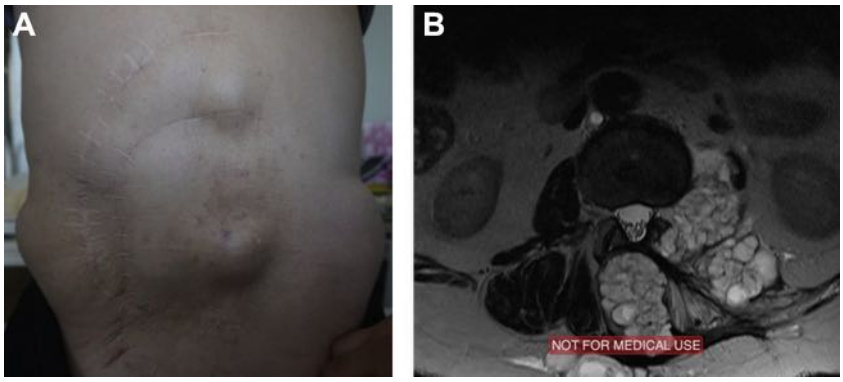

Figure 4. Recurrent thoracic chondroma presenting with worsening back pain and increased growth. (**A**) Image of the patient's thoraco-lumbar junction demonstrating an expanding, palpable mass over the previous surgical site; (**B**) Axial T2 MRI at the level of the tumor demonstrating expansion of the tumor from the paraspinal muscles to the retroperitoneal space.

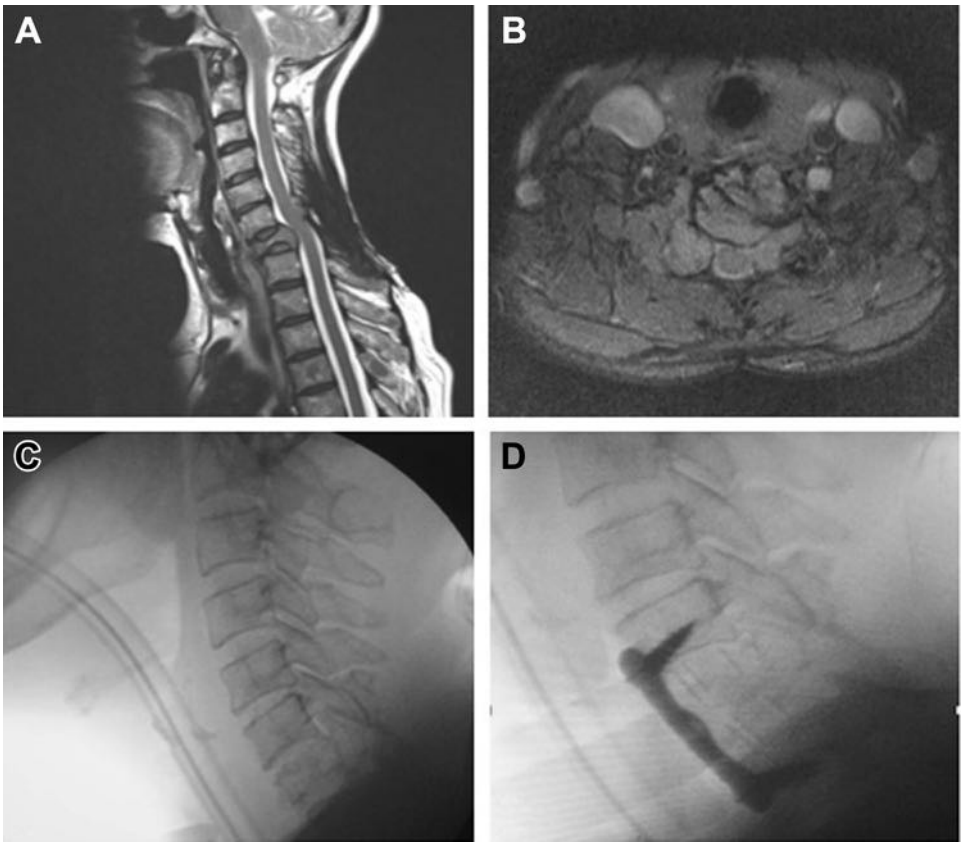

Figure 5. Sagittal (**A**) and axial (**B**) T2-weighted magnetic resonance image images of C7 plasmacytoma with progressive kyphosis; intra-operative lateral X-rays before (**C**) and after (**D**) decompression and reconstruction demonstrating correction of cervical alignment and final instrumentation.

operative room had a functioning ventilator, requiring neurosurgical procedures performed in the other room to be bagged-by-hand for the entirety of the procedure. As part of the surgical and teaching mission, a dedicated neuroanesthesiologist fostered a parallel relationship of learning and collaboration with the local anesthesiology staff. From incorporating case-based learning by mentoring young anesthesiologists and residents in training on techniques such as perioperative nerve blocks (Figure 6), to promoting active intellectual conversation with educational lectures, to providing basic but necessary resources including video-assisted laryngoscopes, temperature management and continuous end-tidal CO_2 monitoring, this collaboration not only forged a new international relationship but also ensured an improved standard of intraoperative neuroanesthesia at Shastin Central Hospital.

Moreover, our surgical cases would not have been possible without the know-how and expertise of our anesthesia teams from the United States and France during our second mission in 2015. Continuous interaction between anesthesiologist from Mongolia and the United States served as a great example of possible improvement and academic growth. After working closely with U.S. anesthesiologist on the encephalocele case in 2015, and a subsequent visit to the United States for the Postgraduate Assembly of the Annual Meeting of the New York State Society of Anesthesiologists, the Ulaanbaatar anesthesia team successfully administered anesthesia during our 2016 encephalocele case, using the latest technology and monitoring modalities they have learned from the previous year's mission experience and the visit in New York.

STRENGTHENING INTERNATIONAL CLINICAL AND RESEARCH COLLABORATION

In efforts to further international collaboration in the clinical neurosciences while in Mongolia, the mission team participated in a Ministry of Health–sponsored National Neurovascular Conference in 2015 and in the Annual Neurosurgery Conference in 2016 celebrating the 50th Anniversary of the foundation of the Department of Neurosurgery in Mongolia. This contribution was coordinated with the help of the local neurosurgeons and served as an environment to inform the local neurosurgeons, neurologists, neuroradiologists, and internists attending the conference of current treatment options and paradigms and evolving standards

Figure 6. A scalp nerve block before frontonasal encephalocele repair.

of interventional care in the United States for patients with cerebrovascular disease, including anesthetic management.

Although the conference concentrated specifically on neurovascular disease and the increasing rate of stroke in Mongolia, it was an excellent forum to create professional relationships with local healthcare professionals aiming to advance the standard of care for ischemic stroke patients in Mongolia. This type of lecture based communication, although brief and less intimate than one-on-one meetings, served a very important role in accomplishing the goals of the mission. With it, we were able to reach out to a large local audience, who would never have been exposed to the information we shared, had we sought them out individually. The conferences set the stage for future collaboration and widened the number of physicians exposed to this international exchange.

CONCLUSIONS

As long as the disparity in healthcare exists across the world, medical missions will continue to strive to closing the gap and cultivating a standard of care across nations. Charitable donations of resources and volunteer clinics/surgeries provided for patients in need will always satisfy the altruistic essence of these missions. The true testament to a successful endeavor, however, is in its ability to foster in a local environment ready for change and betterment, the establishment of lasting knowledge transfer and improvements that will eventually no longer require the assistance of others. After all, stability and progress are most permanent when arising from internal sources. Although we have seen promising changes in successive years of the surgical mission to Mongolia, we continue to strive for further improvements. Future missions may include further political and economic advocacy to local government and/or industry that would strengthen the local effort for healthcare improvement. We also hope that future missions will turn away fewer patients from surgery due to a lack of equipment and expertise. To achieve this goal, we plan of a more detailed vetting process of procedures and expanding the surgical teams involved to ensure that all necessary tools, both intellectual and physical, are present for the service of the Mongolian people. As we have seen in our experience with the surgical and teaching mission to Mongolia, when directed appropriately, medical missions can serve as the perfect medium in fostering that environment, providing local healthcare professionals with the knowledge, skills, and motivation to create self-sustaining improvement in their own country, hence promoting intellectual and technological advancement and raising the standard of care.

ACKNOWLEDGMENTS

In any collective endeavor, a key but often forgotten factor is the mutual collegiality, hospitality and dedication that the involved parties have to each other and to the cause. These missions were fueled not solely by the motivation of the local neurosurgical team to find new and better ways of helping their patients but more importantly, due to the high moral character and culture of hospitality that comes so naturally to the Mongolian people.

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