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Arnold, P.M.; Owens, L.; Heary, R.F.; Webb, A.G.; Whiting, M.D.; Vaccaro, A.R.; ... ; Harrop, J.S.

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Lumbar Spine Surgery and What We Lost in the Era of the Coronavirus Pandemic

A Survey of the Lumbar Spine Research Society

Paul M. Arnold, MD,* Linda Owens, PhD,† Robert F. Heary, MD,‡§
 Andrew G. Webb, PhD,† Mark D. Whiting, PhD,† Alexander R. Vaccaro, MD, PhD,||
 Ravishankar K. Iyer, PhD,¶ and James S. Harrop, MD#

Study Design: This was a survey of the surgeon members of the Lumbar Spine Research Society (LSRS).

Objective: The purpose of this study was to assess trends in surgical practice and patient management involving elective and emergency surgery in the early months of the coronavirus pandemic.

Summary of Background Data: The novel coronavirus has radically disrupted medical care in the first half of 2020. Little data exists regarding the exact nature of its effect on spine care.

Methods: A 53-question survey was sent to the surgeon members of the LSRS. Respondents were contacted via email 3 times over a 2-week period in late April. Questions concentrated on surgical

and clinical practice patterns before and after the pandemic. Other data included elective surgical schedules and volumes, as well as which emergency cases were being performed. Surgeons were asked about the status of coronavirus disease 2019 (COVID-19) virus testing. Circumstances for performing surgical intervention on patients with and without testing as well as patients testing positive were explored.

Results: A total of 43 completed surveys were returned of 174 sent to active surgeons in the LSRS (25%). Elective lumbar spine procedures decreased by 90% in the first 2 months of the pandemic, but emergency procedures did not change. Patients with “stable” lumbar disease had surgeries deferred indefinitely, even beyond 8 weeks if necessary. In-person outpatient visits became increasingly rare events, as telemedicine consultations accounted for 67% of all outpatient spine appointments. In total, 91% surgeons were under some type of confinement. Only 11% of surgeons tested for the coronavirus on all surgical patients.

Conclusions: Elective lumbar surgery was significantly decreased in the first few months of the coronavirus pandemic, and much of outpatient spine surgery was practiced via telemedicine. Despite these constraints, spine surgeons performed emergency surgery when indicated, even when the COVID-19 status of patients was unknown.

Level of Evidence: Level IV.

Key Words: COVID-19, pandemic, spine surgery, telemedicine

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The coronavirus pandemic, which began in January 2020 in the United States, has resulted in significant practice changes of medicine. Hospitals had to shift resources to care for these critically ill patients and relocate assets away from nonurgent care.^{1–11} These changes included the acquisition of personal protective equipment; restrictions on outpatient visits and families accompanying patients to medical appointments; travel bans by hospitals and universities on their medical personnel, particularly physicians; cancellation of elective and outpatient procedures in the anticipation of a surge of infected patients requiring hospitalization and intensive care

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From the *Department of Neurosurgery; †Stephens Family Clinical Research Institute, Carle Foundation Hospital, Urbana, IL; ‡Hackensack Meridian School of Medicine, Nutley; §Mountainside Medical Center, Montclair NJ; ||Rothman Orthopaedic Institute, Philadelphia, PA; ¶Department of Electrical and Computer Engineering, The Grainger College of Engineering, Urbana, IL; and #Department of Neurosurgery, Thomas Jefferson University, Philadelphia, PA.

Dr Vaccaro has consulted or has done independent contracting for DePuy, Medtronic, Stryker Spine, Globus, Stout Medical, Gerson Lehrman Group, Guidepoint Global, Medacorp, Innovative Surgical Design, Orthobullets, Ellipse, and Vertex. He has also served on the scientific advisory board/board of directors/committees for Flagship Surgical, AO Spine, Innovative Surgical Design, and Association of Collaborative Spine Research. Dr Vaccaro has received royalty payments from Medtronic, Stryker Spine, Globus, Aesculap, Thieme, Jaypee, Elsevier, and Taylor Francis/Hodder and Stoughton. He has stock/stock option ownership interests in Replication Medica, Globus, Paradigm Spine, Stout Medical, Progressive Spinal Technologies, Advanced Spinal Intellectual Properties, Spine Medica, Computational Biodynamics, Spinology, In Vivo, Flagship Surgical, Cytonics, Bonovo Orthopaedics, Electrocore, Gamma Spine, Location Based Intelligence, FlowPharma, R.S.I., Rothman Institute and Related Properties, Innovative Surgical Design, and Avaz Surgical. In addition, Dr Vaccaro has also provided expert testimony. He has also served as deputy editor/editor of *Clinical Spine Surgery*. The remaining authors declare no conflict of interest.

Reprints: Paul M. Arnold, MD, Department of Neurosurgery, Carle Neuroscience Institute, 610 North Lincoln Avenue, Urbana, IL 61801 (e-mail: paul.arnold@carle.com).

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unit care; and the rapid shift of outpatient care to telemedicine visits. Visitors were forbidden in senior citizen living facilities in many states, and in some locations, funerals were not allowed due to concerns for spread of the virus.

Spine surgery workflow has also been significantly affected by this coronavirus pandemic. Hospitals essentially canceled all elective procedures starting in March 2020, and in-person clinic visits were limited to emergency consultations only; some practices went to 100% telemedicine appointments in the early days of the crisis.^{1,2,6-8} Nonsurgical spine care, including physical therapy and interventional procedures, were often delayed or postponed indefinitely. Hospitals developed comprehensive plans and protocols to categorize and prioritize which procedures should be done emergently, as well as how spine surgeons could be “repurposed” in the event of an overwhelming surge of coronavirus disease 2019 (COVID-19) hospitalizations.

To detail more information on the effects of the pandemic on lumbar spine care, a survey study was developed, and surgeon members of the Lumbar Spine Research Society (LSRS) were queried as to the changes that had occurred at their local level.

METHODS

To gauge practice patterns following the spread of the coronavirus pandemic, a 53-question survey (Supplemental Digital Content 1, <http://links.lww.com/CLINSPINE/A200>) was electronically sent to all surgeon members of the LSRS after approval of the board of directors. The questions were designed to determine the effects of coronavirus on the day-to-day activities of the practicing spine surgeon, as well as to assess which procedures (if any) were still being performed. Several clinical scenarios were designed specifically to evaluate the indications for when a surgeon would operate for a particular lumbar condition. The questionnaire also examined individual surgeons' and hospital practices concerning testing for the virus.

The survey was carried out during the initial portion of the pandemic. The survey consisted of several elements. The first consisted of individual demographics, such as specialty, time in practice, and whether they had been tested for the virus. The second component looked at changes in practice, such as surgical and clinical volume reduction, use of telemedicine appointments, which lumbar diseases were being treated, prioritization of surgical case, and operating room cancellations. The third aspect examined what was anticipated to happen in the near future and how and whether full practice capacity would be restored. The fourth aspect of the survey consisted of several clinical scenarios, assessing categorization and prioritization for an individual spine condition that would result in surgical intervention.

RESULTS

Of the 174 LSRS members invited to participate, 43 completed the survey, for a response rate of 24.7%.

All respondents were spine surgeons, with nearly two third (65.1%) of the responding surgeons were orthopedic surgeons with 34.9% being neurosurgeons. All completed a fellowship as part of their training. Nearly, three quarters (72.1%) were employed in academic/medical school settings, with 9.3% in private practice, 4.7% employed by a hospital, and 14.0% in privademic hybrid model.

The majority of the respondents' practices were located in urban areas (76.7%), with the remaining practicing in suburban or rural areas. In all, 27.9% were in practice for 10 or fewer years, 39.5% 11–20 years, 23.3% 21–30 years, and the remaining 9.3% 30 or more years.

The vast majority of responding surgeons were men (83.3%). Among the respondents who provided their age (n = 40), the age ranges from 35 to 73, with a mean of 51.

COVID Testing and Restrictions

Only 11%, 5 of the 43 respondents, were tested for COVID-19 at the time the survey was conducted. Of those tested, 1 was symptomatic, and 3 were tested at the request of their hospital or partner. While all of the respondents who were tested had negative results, about one third (34.9%) of them knew someone who had tested positive for COVID-19.

Nearly, all respondents (95.3%) lived in a community that was under a “stay at home” order. However, none of the respondents were personally under quarantine due to exposure of the virus. With respect to business travel, 95.3% of respondents reported that all travel was canceled. In a separate question, 79.1% said their work travel was restricted and 18.6% said their personal travel was restricted.

Surgeries and Pain Management

Results concerning hospital restrictions noted that 55.8% of reported elective surgeries were canceled, while only 2.3% said that hospital meetings had to take place online and nonessential employees were required to work at home. In total, 39.5% responded with the “other” category. These individuals reported all 3 restrictions were in place in their hospital. (The question was mistakenly programmed to allow respondents to check only one option instead of allowing them to check all.)

While nearly all (97.6%) respondents said they were still performing emergency surgeries, only 7% were performing elective surgeries. About half (51.2%) of the respondents said they were offering injections to control pain only in emergencies, while another 28.6% said they were not offering them at all, and 16.7% were offering them per usual standards. One respondent said it depended on the individual provider. Similar to surgeries and pain management, outpatient visits also dropped, with only 20.9% of respondents seeing patients per normal standards—14.0% were not seeing patients at all, and 65.1% were seeing only patients who were deemed critical.

All but 1 respondent reported using telemedicine to evaluate patients. Two third (66.7%) of respondents said that 76%–100% of their outpatient volume was via telemedicine (Fig. 1). In all, 16.7% reported between half and three quarters of their outpatient volume was via telemedicine.

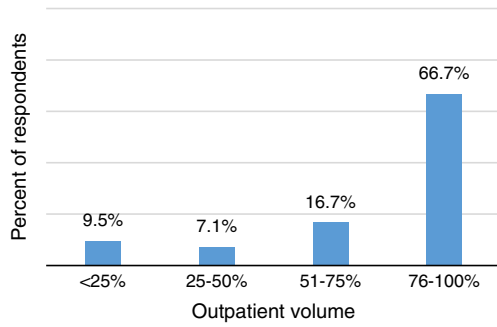


FIGURE 1. Outpatient telemedicine volume.

Respondents experienced a significant decline in clinical volume since January 2020, with 40% indicating a drop of 76%–100% and another 35% seeing a drop of 51%–75%. Just under one quarter (23.3%) said their clinical volume dropped by 26%–50%.

Overall, 90% of respondents said their surgical practices changed because of COVID-19. The questionnaire included 2 questions about returning to normal—when the respondent’s hospital indicated they would return to normal and when the respondent thought they would return to normal. Responses are shown in Figure 2. More than half of the respondents believed it would be > 8 weeks until normal practices returned. In contrast, only 25.6% of hospital management said it would take that long. However, a greater percentage of hospital management also expressed uncertainty about how long it would take (20.9% compared with 7.0%).

The vast majority (90.7%) of respondents anticipated a backlog of patients awaiting surgery. To accommodate the backlog, 75% of respondents said they would increase their clinical volume above normal levels by either operating longer hours during the day (20.9%), operating more days than usual (34.9%), or operating on weekends (9.3%). Nearly, 70% of respondents believed it

would take > 4 weeks to clear their backlogs. While fewer than half (44.2%) of respondents said their hospital had a plan to manage the backlog once the crisis is over, 71.4% said their hospital would allow them to work longer or more days.

When asked who makes the decision about whether or not a particular surgery can occur, 32.6% said the department head or director, 25.6% said it is a discussion between medical services (eg, surgeon and anesthesiologist), 18.6% said the surgeon of the anticipated surgery, and 18.6% said “other.” With respect to elective surgeries, 81.4% of surgeons said they would not perform elective surgeries on a COVID-19 patient. However, all but 1 respondent said they would perform emergency surgery on these patients. The decision about what constitutes an emergency surgery is made either by the surgeon who would perform the surgery (46.5%) or by the surgeon in consultation with the anesthesiologist (41.9%).

Only 26% of respondents said they have increased referrals for nonsurgical management of symptomatic lumbar patients since the pandemic began. For those who have, half of the referrals are for physical therapy, while the remaining half are divided evenly between injections and nontraditional treatments.

The questionnaire included a question about which types of surgeries were being performed at the hospital at the time the respondent responded to the survey. The responses are shown in Figure 3.

Respondents were asked under which circumstances they would perform 4 different types of surgeries. Three of the 4 questions used the same response options and are presented in Table 1. The question regarding intradural, extramedullary tumor surgery had slightly different response options. The condition under which most surgeons would perform that procedure is neurological deficit (72.1%), followed by radiographic evidence of tumor growth (51.2%) and worsening pain (41.9%). Only 2.3% would perform the surgery in a neurologically

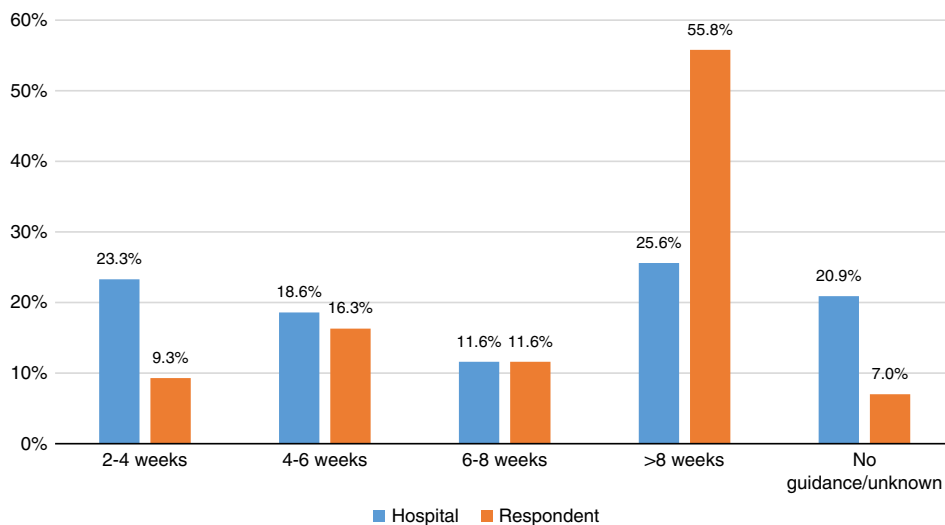


FIGURE 2. Weeks until surgical practice returns to normal.

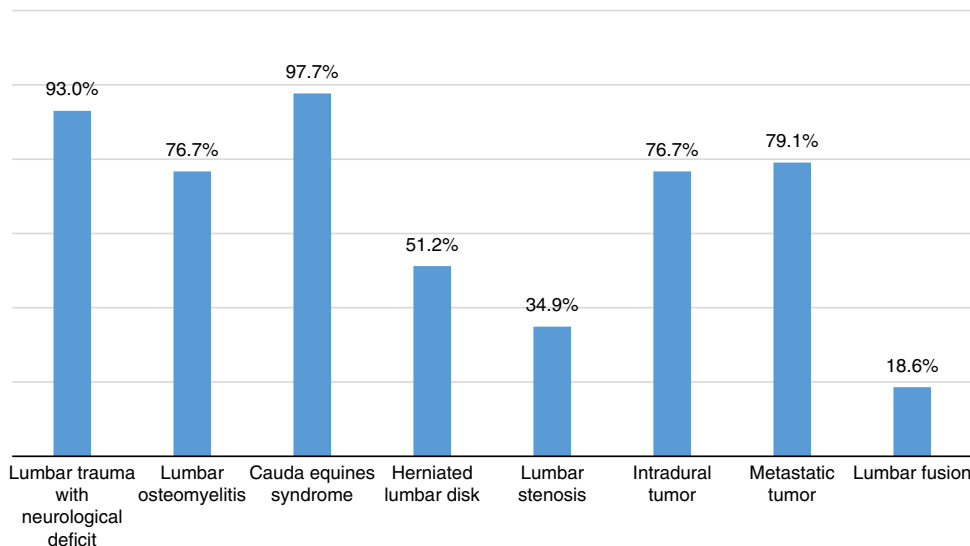


FIGURE 3. Surgeries performed during coronavirus disease 2019 (COVID-19) pandemic.

normal patient with static growth, and 11.6% would not perform surgery under any of these circumstances. The majority of respondents said they would postpone these surgeries indefinitely, as long as nothing had changed.

DISCUSSION

The coronavirus pandemic has precipitated significant changes on the worldwide health care system, and its effects will likely be long-lasting.¹⁻¹¹ This pandemic crisis resulted in elective surgical procedures halting for 2 months, while resources, including human, physical, and financial, were deployed to care for patients with the disease.^{1,2,4,6,8} Hospitals were called upon to draw up contingency plans to both care for the sudden surge of critically ill patients as well as ensure the safety of its medical and nonmedical personnel, as well as noninfected patients. Major professional organizations developed guidelines for their specific patient population, including spine surgery and neurosurgery.^{3,5,10,11} This involved not only setting up testing centers for the virus, but also the possible redeployment of physicians and nurses into roles for which they may not have training. In extreme circumstances, make-shift hospitals were developed to care for an expected onslaught of vulnerable patients.

Elective spine procedures, both inpatient and outpatient, were postponed indefinitely. Outpatient visits were dramatically reduced and/or converted to telemedicine visits. Decisions on whether to operate on patients were made in real time, with only the most seriously ill patients admitted to the hospital and undergoing surgery. As noted

in this study, spine surgeons were willing to defer surgical intervention for an indeterminate period unless patients had either intractable pain or a neurological deficit.^{1,2,8}

Data from this study revealed several interesting trends. Elective surgery was almost universally canceled at hospitals of all sizes and in all locations at the same point in time.¹⁻¹¹ Decisions regarding whether a patient should undergo surgery were almost exclusively left up to the physicians caring for the patient, either the surgeon alone or in consultation with the anesthesia team, rather than the hospital administration. At the height of the crisis, when this survey was taken, surgeons and nonsurgeons alike were unable to accurately predict when elective surgery would resume on a normal or even reduced basis.

However, spine surgeons were in agreement when it came to whether a patient required emergency surgery. Patients with neurological deficit, whether fixed or progressive, were offered surgery regardless of the etiology or their COVID status, as testing early in the pandemic was inconsistent. This included surgery for spine trauma, osteomyelitis, cauda equine syndrome, tumor (primary or metastatic), or degenerative disease. Surgeons were likely to operate, more often than not, on patients with intractable pain from a degenerative condition. Patients with ongoing, nonworsening pain, who may have been scheduled for surgery before the crisis hit, saw their surgeries canceled for an indefinite period of time.^{1,2,6-8}

Telemedicine visits became increasingly common, and in several practices, the exclusive way in which outpatient spine surgery was practiced. Applications such as

TABLE 1. Circumstances Respondents Would Perform 4 Different Types of Surgeries

	None	With Neurological Deficit	With Intractable Pain	Failure of Medical Management and Stable Radiculopathy
Symptomatic herniated lumbar disk	9.3	88.4	65.1	7.0
Symptomatic lumbar stenosis	9.3	87.4	53.5	11.6
Grade I lumbar 4-5 degenerative spondylolisthesis	11.6	81.4	53.5	9.3

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Zoom or Skype were rapidly adopted to mitigate the risk of in-person visits. The decision by Medicare to allow for payment for these encounters played no small role in their acceptance by physicians. Patients quickly accepted this new reality. Functions such as screen sharing allowed physicians to review radiographic images with their patients in real time. As the pandemic wanes, it is likely that telemedicine will continue to play a large role in outpatient visits, as using this technology allows patients who are unable to travel to see their health care provide will still have access to health care.

We have learned several things from the coronavirus pandemic of 2020. Despite the risks and barriers to patient care, it was possible to maintain spine care for patients in need, both on an inpatient and outpatient basis. Physicians of all specialties, including spine surgeons, used judgment and balanced the risks of performing surgery, both to themselves and their patients, in offering appropriate treatment. And, as always, physicians became ingenious in devising protocols and novel workarounds for the challenges faced in these unusual and uncertain times.

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