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Original Article

Designing a Guideline for Elective and Emergency Spinal Cord Surgeries During the COVID-19 pandemic

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Abstract

Introduction: There is a need to prepare clinical guidelines for conducting elective or emergency spinal cord surgeries in people who may be carriers of the COVID-19. Therefore, the study aimed to design a guideline for conducting elective spinal cord surgeries during the COVID-19 pandemic.

Methods: The clinical guidelines and systematic reviews providing recommendations for elective and emergency spinal cord surgeries were collected by an initial search. A group of nine experts were designed a domestic preliminary guideline using six available guidelines presented in four studies. Scoring was conducted based on the AGREE (Appraisal of Guidelines Research and Evaluation) tool.

Results: The guideline was prepared in eight subscales, including outpatient visit and counseling, protective measures for health personnel, surgical considerations during the coronavirus pandemic, intraoperative considerations, managing aerosol producing activities, elective and emergency spinal cord surgery, and patient intubation and cardiopulmonary resuscitation. Each of these subscales included several specific recommendations.

Conclusion: It recommended to reduce the capacity of inpatient wards to half during the coronavirus pandemic, give priority only to emergency surgeries, presence of skilled residents (senior year residents), use personal protective equipment, use the least number of people in the operating room, and reduce the length of surgery without compromising its quality.

Keywords: Spinal cord surgery, COVID-19, Guideline, Emergency, Elective.

Introduction

The novel coronavirus disease, globally known as COVID-19, became a pandemic shortly after its emergence in Wuhan, China, posing major challenges to the health systems of all countries [1, 2]. Many people are contracting the infection because of the rapid spread of the disease in society. Many of them may remain asymptomatic (but still carriers), who can transmit the infection to medical staff when referring to health centers, thus that needs special attention [3, 4].

The COVID-19 disease has caused many challenges to all medical staff with any specialty, including neurosurgeons [5], who may face serious decision-making controversies for managing elective and emergency surgeries. As well, outpatient counseling, organizing personnel (residents, nurses, and other medical staff) to reduce the risk of exposure, and the low capacity of intensive care units are among other problems during the pandemic [6]. These challenges led

different countries to promptly prepare several clinical guidelines with the help of specialized associations. However, some of the recommendations of these guidelines apply only to specific locations or conditions; for example, repeated PCR testing as the first diagnostic step and the constant use of personal protective equipment for all, which may be only applicable to well-resourced countries. In Iran, due to the diverse capacities of the health system in different dimensions, there is a need to localize clinical guidelines and recommendations by making amendments and adding new items. Moreover, the country faces the possibility of new COVID-19 waves despite the descending trends of the disease in some areas, further highlighting the immediate need for developing applicable and standard clinical guidelines.

The guidelines help to surgeons and medical staff to make decisions in critical situations. Also, the guidelines improve the order and speed of tasks and prevent unwanted exposure of medical staff (Surgeon, resident, anesthesiologist, anesthesiologist, and operating room specialist, nurse, head nurse). So, using the guidelines of other countries and gathering evidence and expert opinions, the present study aimed to prepare a domestic clinical guideline for conducting elective spinal cord surgeries during the COVID-19 pandemic.

Methods

This study exploited a developmental design. Developmental studies aim to promote available knowledge about a phenomenon using a systematic, scientific, and acceptable process within the framework of a research study. The present study was conducted based on the localization process for 12 months (the last six months of 2020 and the first six months of 2021). The localization of a clinical guideline consists of three steps: planning, localization, and finalization, each of which has several steps.

Planning

In this step, the topic of the study and its goals were characterized, and initial searches were independently performed by two of the researchers to obtain relevant clinical guidelines. Then a specialized panel consisting of nine accredited experts was formed. Each of the experts had duties and responsibilities related to the localization process.

Localization

In this step, clinical questions were initially designed regarding the topic and predetermined objectives using the PIPOH method: P: Population (patients with the COVID-19 disease, requiring elective or emergency surgery), I: intervention (surgery), P: professionals (surgeons, residents, anesthesiologists, operating room technicians, and nurses), O: outcomes (results and consequences), and H: health care setting (operating rooms and inpatient wards). Finally, two members of the specialized panel searched for the guidelines related to the topic and objectives of the study. After the construction of the final "specialized panel" consisting of 9 people (neurosurgeon, infectious disease specialist, preventive medicine specialist, nursing specialist), the job description of each member at each stage was determined.

Regarding the need for prompt preparation of clinical guidelines in this area, the mentioned steps were abridged. First, the available clinical guidelines [7-12] (related to neurosurgery procedures during the COVID-19 pandemic) were obtained by searching the Scopus, PubMed, Web of Science, and Google Scholar databases. Due to the novelty, a few similar and valid guides were found and employed to design the domestic guideline. These guides were extracted from published articles, and the questions and items were designed by the researchers based on the PICO (Patient, Intervention, Comparison, Outcome) approach, and their relevant answers were also extracted from the same clinical guides.

Due to some gaps in the clinical guides, a second

search was conducted in the mentioned databases to find additional evidence and resources to answer the questions raised. In this regard, new evidence was extracted from four systematic reviews [13-16]; It should be noted that in the search conducted by the researchers, the guideline was not found in the field of neurosurgery in the corona pandemic period. Finally, the answers and questions were re-examined, and if necessary, questions were restructured in a more detailed form and as multiple questions.

External Assessment and Consensus

At last, the answers were uniformly compiled as recommendations in eight sections and sent to four neurosurgeons and two infectious disease specialists to assess them according to the Appraisal of Guidelines Research and Evaluation (AGREE) tool. In each section, recommendations were mentioned first, followed by references. A guide for scoring based on the AGREE scale was also sent to the evaluators. This tool includes 23 criteria assessing the methods used to compile the guideline, as well as the quality of its reporting, in six areas: (1) outlook and purpose, (2) stakeholder participation, (3) the accuracy and validity of methodology, (4) the clarity of presentation, (5) applicability, and (6) independency. The scoring system is based on a 4-point Likert scale (strong disagreement to strong agreement). The score of each section is obtained by summing the scores given to each of its items. Finally, the total score is standardized according to the maximum score obtained in each area. Assessment by this tool requires at least two and preferably four evaluators. In this study, four evaluators were employed, five clinical guidelines acquired a score higher than 40% (according to AGREE with criteria), and their results were used to develop the domestic guideline.

Agreement Level and Compiling Final Recommendations

The scores given by experts were analyzed according to the AGREE appraisal criteria to determine the level of agreement for each recommendation. The lowest agreement level for each section was mentioned as 80%. The agreed recommendations were regarded as the final guides, which were reviewed and edited again to finally present the clinical guideline for elective and emergency spinal cord surgeries during the COVID-19 pandemic.

Results

General Principles

1. All patients should be screened for clinical signs.
2. All the cases suspected to have the COVID-19 disease should be referred to the infectious disease clinic.

Outpatient Visits and Counseling

1. If possible, online or telephone counseling should be delivered.
2. The examination room should have proper ventilation and disinfection equipment. 3.
Personal protective equipment should be present in the examination room.
4. Protective equipment should be available for patients.
5. Patients should be screened for COVID-19 symptoms when entering the clinic, and suspected patients should be referred for respiratory triage (the COVID-19 clinic).
6. Disinfectants should be frequently used.
7. Only one companion should be allowed to attend the patient into the examination room.
8. A proper distance from patients should be kept.
9. Registering patients' records should be performed.

Protecting Health Personnel

1. Strict observance of hand rub is recommended. Gloves cannot replace hand washing, and hand rub should be done before and after wearing gloves.
2. If the patient has symptoms suspicious for COVID-19, and it is necessary to perform neurosurgical clinical examination, personal

protective equipment should be strictly used according to the hospital's protocols.
3. Personnel should screen themselves for COVID-19 signs and notify authorities if they have contracted the infection.
4. A safe distance from the patient should be observed.
5. For highly suspicious cases or those with confirmed COVID-19 (based on the discretion of an infectious disease specialist or according to respiratory triage) who need hospitalization, the patient should be admitted to the COVID-19 or an isolated ward.
6. The patient should wear a mask during transfer.
Inpatients: These include the patients admitted to the emergency ward or the intensive care unit due to urgent problems.

Surgical Considerations During the Coronavirus Pandemic:

1. If possible, elective surgery should be postponed until the pandemic is under control, or elective surgeries requiring hospitalization to be reduced by up to 50%.
2. Emergency surgeries should be performed according to the protective protocols for patients and personnel and according to the hospital's clinical guidelines.
3. If there is a suspicion of COVID-19 (based on a history of exposure or clinical examination), PCR or lung CT scan should be performed before elective surgery. Appropriate diagnostic procedures can be decided after counseling with an infectious disease specialist or based on respiratory disease triage.
4. Physicians, patients, and personnel should carefully stick to personal protective instructions.
5. The number of hospitalized patients in each room should be minimal, and unnecessary traffic and visiting patients must be avoided.
6. Patients should be discharged as soon as possible.
7. The PCR test should be performed in children (instead of a CT scan) due to limitations in the allowable radiation dose.
8. Before enlisting necessary surgeries, the capacity of empty beds, including ICU beds, should be checked for post-surgery hospitalization.
9. It is recommended to organize service provider personnel, including the surgical team, assistants, and nurses, into two or more separate teams to minimize interpersonal contacts and the risk of disease transmission.
10. If possible, post-discharge visits and follow-up should be performed via telemedicine.

Intraoperative Considerations

1. It is recommended to reduce the duration of surgery and use less invasive methods.
2. Aerosols should be removed by suction.
3. It is advisable to avoid activities that may spread body secretions in the environment.
4. The crowd in the operating room should be kept as least as possible.
5. The personal protective shields of operating room staff should be according to the hospital's protocols.
6. Patients with COVID-19 should be operated in a room equipped with negative pressure ventilation.
Managing Aerosol Producing Activities:
1. The use of drills must be minimized.
2. The number of personnel during the process should be the least.

Surgical Procedures

1. In most spinal cord surgeries, the face and eyes are routinely protected.
2. Washing while drilling is critical, especially in the surgeries involving the anterior cranial base due to its connection with the cranial cavity and the break of the airway sinus.
3. Endonasal surgeries are riskier than other procedures due to aerosol production during drilling. In Wuhan, China, the rate of infection was higher in ENT surgeons than in other specialists, and even N95 masks did not prevent disease transmission.
Emergency or Immediate Elective Spinal Cord

Surgery:

1. Spine pathological lesions compressing the spinal cord.
2. Spinal cord lesions associated with progressive neurological defects.
3. Progressive cervical and thoracic myelopathy.
4. Spinal fracture associated with severe pain, neurological defect, or spine instability.
5. Spinal cord primary tumors or metastasis to the spine accompanied by pain/progressive neural damage, or spine instability.
6. Spinal cord infections are associated with abscess, spine instability, or pressure on the spinal cord.
7. Myelomeningocele associated with fluid leakage.

Intubation

1. During intubation and extubation, all the people whose presence is not necessary should leave the room and return after the procedure.
2. Between operations, a time (around one hour) should be dedicated for disinfecting surfaces and air conditioning.
3. Use of personal protective equipment from the beginning to the end of intubation
4. Perform intubation by experts until the time of intubation is reduced

Cardiopulmonary Resuscitation

1. For the cardiopulmonary resuscitation of patients with suspected or confirmed COVID-19, who need chest massage or artificial respiration due to cardiac arrest, all staff should be fully covered in protective clothing, including long gowns, gloves, N95 or FFP2 mask, and glasses or face shield.
2. If protective measures or equipment are not attainable, treatments should be given by a defibrillator if it is possible.

Contact with a COVID-19 Patient

1. Face masks, disinfectants (including alcohol-based (60 to 95%) detergents), and napkins should be provided at the entrance of places, waiting rooms, and patient reception.
2. All the patients requiring surgery should be managed with caution. The anesthesia team and operating room, and infection control personnel should be informed about surgery.

Discussion

Spine surgery amid the COVID-19 pandemic faces many challenges, including a shortage in ICU beds and direct contact with the patient's secretions during several procedures. Therefore, the current guideline was designed to assist spine surgeons and medical staff to make correct decisions to protect their own and their colleagues' lives during the pandemic. This guideline was prepared using similar recommendations in other countries, such as available evidence and experts' opinions.

The assessment of selected clinical guidelines revealed that the recommendations related to accurate patient identification were not fully implementable due to the lack of required facilities in the country's health system, so they should have been modified accordingly. In this regard, the first modification was related to the process of patient admission to different hospital wards. The minimum number of admitted patients was set to two in large spaces and one in small rooms due to the inadequacy of hospital beds in Iran. Although, it has been recommended to hospitalize only one patient in each room. The second modification was that the PCR test was confined to suspicious, but not all, patients. It has been recommended that all patients undergo the lymphocyte count and PCR tests, and patients should be allowed for hospitalization only after counseling with an infectious disease specialist. However, PCR was considered only for suspicious patients due to insufficient resources in Iran. The third change was associated with a recommendation stating that no one should attend the patient into the examination room. There is a need for the attendance of a companion with a moderate to a high level of education. It is due to the cultural context of Iran and the fact that many patients may be illiterate and

not able to answer queries during clinical examination, such as the need for explaining surgery steps and their necessity and possible complications. So, this item was changed in our guideline accordingly.

The fourth change was related to the interval between surgeries. It has been recommended that COVID-19 patients undergo surgery in a separate operation room. Nevertheless, due to limited facilities in Iran, it is almost impossible for most Iranian hospitals to fulfill this requirement. So, in the presently developed guideline [17,18], it was recommended to perform surgeries at least one hour apart from each other so that the room and equipment can be completely disinfected[19, 20].

Credible clinical guidelines are essential tools informing us about evidence-based performance[21]. Clinical guidelines are also applicable for summarizing research findings and making correct and uniform clinical decisions [22,23]. This can reduce diversity in clinical practice, promote the optimal use of resources, help identify gaps in knowledge, and prioritize research activities. Studies have highlighted organizational limitations and insufficient knowledge (i.e., extrinsic), such as unclear recommendations (i.e., intrinsic) as the most significant barriers to effective and widespread use of clinical guidelines [24-26]. Therefore, it seems that support by policymakers and health authorities and educating health care workers about the importance of evidence-based performance are necessary steps to implement clinical guidelines in practice and improve the quality of health services [27-30].

Limitations and Recommendations

One limitation of this study was the low number of similar guides employed in other countries. It is also important to constantly update recommendations based on new evidence observed. It is recommended to develop national guidelines in other medical disciplines to better deal with the COVID-19 pandemic and similar diseases in future.

Conclusion

During the coronavirus pandemic, it is suggested to reduce the capacity of hospitalization by 50% so that the number of surgeries falls and priority is given to emergency surgeries. The use of personal protective equipment, minimizing the number of staff present in the operation room, and reducing the duration of surgery (without compromising its quality) should also be considered.

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Conflict of Interest Disclosures

The authors have no conflicts of interest to declare

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Authors' Contributions

All authors involved the preparation of the manuscript.

Ethical Statement

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