Experience in Neurosurgery During the Prevalence of Coronavirus Disease in 2019
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Abstract: In order to summarize the experience of neurosurgery in The Third People’s Hospital of Hubei Province after the outbreak of COVID-19 in 2019, 28 patients were admitted from January 5, 2020 to February 17, 2020. A series of department formulate and constant improvements were made, including elective operation cancellation, altered conventional outpatient service into online outpatient service, strict control of inter department consultation prevention and entering the department, improvements in operation and treatment processes, and strict ward management. As a result, 1 patient with hypertensive cerebral hemorrhage and deep vein thrombosis of the right lower extremity died suddenly due to pulmonary embolism during anticoagulation treatment. Two patients with deep coma gave up treatment and died. No patient was confirmed to be infected with COVID-19 in hospital. One doctor had a low fever and cough in January, and CT showed a small nodule in the lower left lung. After 2 weeks isolation and oral anti-infective drugs, the chest nodule disappeared. One nurse was isolated as a close contact with infected patients. One nurse was confirmed to be infected with COVID-19 in a mild symptom. She was discharged after being cured in the infected department. In conclusion, measures like sufficient theoretical training and protection upgrading for medical staff, continuous improvement on the understanding of COVID-19 characteristics and transmission routes, formulation of strict department management system, monitoring of patients and their families, could effectively deal with the epidemic situation in the neurosurgery department.

Key Words: 2019 coronavirus disease, experience, neurosurgery

A novel coronavirus infection, which is mainly manifested as pneumonia, appeared in late December 2019 in Wuhan, Hubei, China. The National Health Commission named this new type of coronavirus pneumonia as “New coronavirus pneumonia” in February 8, 2020. On February 11, WHO officially named the new coronavirus as COVID-19.

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Received March 11, 2020.

Accepted for publication March 30, 2020.

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Our study was approved by the Ethics Review Board of The Third People’s Hospital of Hubei Province.

The authors report no conflicts of interest.

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

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ISSN: 1049-2275
DOI: 10.1097/SCS.0000000000006619
hospital to discharge, only one patient with cerebellar hemisphere tumor and hydrocephalus cannot postpone external drainage of hydrocephalus and tumor resection. Except surgery. All emergency patients or inter department consultation patients should have lung CT examination at the same time. If the CT suspect COVID-19 patients do not need emergency operation, they should be transferred to the designated medical institution of epidemic situation. If the operation is needed, the operating room and single isolation ward should be carried out strictly according to the third-level protection requirements. After the operation, the patients can be arranged to stay in the infectious disease area, and the suspected patients can stay in the newly set isolation room in the department, and the specially-assigned person is responsible for it. The room for diagnosis and treatment articles is specially designed.

RESULTS

Three patients died during this period. One case of hypertensive intracerebral hemorrhage complicated with deep vein thrombosis of the right lower extremity died suddenly due to pulmonary embolism during anticoagulation treatment (the family refused to install the inferior vena cava stent), two patients with deep coma (one case of V-grade aneurysm, one case of brainstem hemorrhage) gave up treatment and died. No patient in the hospital was confirmed to be infected with COVID-19, and 2 family members were confirmed infected due to pulmonary CT examination image, isolated. One doctor had low fever and cough in January, CT of the lung showed a small nodule in the lower left lung. Two weeks after isolation with oral anti-infective drugs at home, the small nodule disappeared after recheck (there was no condition for nucleic acid detection at that time); 1 nurse was isolated as a close contact due to the infection of her parents; 1 nurse was confirmed to be infected with COVID-19 due to fever and cough and nucleic acid detection, which was a mild symptom, so she was admitted to hospital for infection Inpatient Area. The department has been keeping a living force, insisting on neurosurgery work until the request of the higher authorities to turn into a designated anti epidemic hospital, without isolation or closure of the department due to the outbreak of disease in the department.

DISCUSSION

In the early stage of the epidemic, due to the insufficient understanding of the COVID-19 and the lack of medical knowledge, the hospitals in Wuhan city was seriously affected. According to the statistics of the National Health Commission, until 24:00 on February 11, 1716 cases were confirmed by medical staff nationwide, accounting for 3.8% of the confirmed cases nationwide, including 6 deaths. There were 1502 confirmed cases among medical staff in Hubei Province, accounting for 87.5% of the total number of medical staff infections in China. Among them, 1102 cases were in Wuhan, accounting for 73.4% of the total number in the province. Medical personnel entering the catheter room would require the operation is needed, the operating room and single isolation ward should be carried out strictly according to the third-level protection requirements. After the operation, the patients can be arranged to stay in the infectious disease area, and the suspected patients can stay in the newly set isolation room in the department, and the specially-assigned person is responsible for it. The room for diagnosis and treatment articles is specially designed.

After the warning issued by Wuhan health and Health Commission, our department simultaneously carried out lung CT screening for every patient to be admitted to the department. As long as there is image manifestation of viral pulmonary inflammation, it was be treated as a suspected case, and no matter whether the patient had fever and cough symptoms or not, we did not wait for the nucleic acid test report (in the first period of outbreak, the nucleic acid test took a long time and the reagent was seriously insufficient). It is earlier and stricter than the diagnostic standard in Hubei published by the national health and Health Commission on February 5. Among them, the indications may be expanded, and a few patients who are not COVID-19 are refused to enter the department, but the intrusion of an infected person could cause a considerable number of patients and staff in the hospital to be infected. In serious cases, the department could lose its combat effectiveness and be forced to close the department. The lesson of some brother departments is a must learn. In this case, it is right to adhere to the principle of “better waste than indulge.”

When the patients are admitted to the department, they should be treated with humanistic care, so as to reduce the sufferings and disputes of the patients. When patients from other places contact and request to be transferred to our hospital (during the closure of the city, they can enter the city with the certificate of local prevention and control department), they should first provide the medical video patient, lung CT film online, and only when they need surgery and no viral inflammation of the lung can they be transferred to our hospital. On February 11, 2020, Wuhan First Hospital was transferred to the designated anti epidemic hospital according to the command of the municipal prevention and control headquarters, and 17 neurosurgical patients need to be transferred to Hubei Province in the third people’s Hospital. We sent a team of neurosurgeons, radiologists and respiratory doctors to move to the hospital, and rechecked lung CT one by one. Seventeen patients did not meet our requirements and remained in the anti epidemic hospital as suspected patients, avoiding the wrong path of patients, preventing the input risk and ensuring the safety of the ward. Pay attention to cut off the invisible way that may spread the epidemic—accompanying family members. According to the regulations of the department, only one family member is allowed to accompany patients, and it is not allowed to change the company. On the premise of wearing a mask, it is required to measure the body temperature twice a day, minimize the access to the ward, refuse to visit, advocate video visit, measure the body temperature in and out of the department, and guide the correct implementation of cough eti-quette and hand hygiene. On February 14, 2020, our hospital conducted chest CT survey for all the family members of the inpatients. T Two family members accompanying the patients had imaging diagnosis, and the two were forbidden to leave according to the requirements. The hospital sent a car to bring them to the guidance shelter hospital for isolation. The unaccompanied patients would rather contact volunteers or the hospital to provide accompanying care.

The treatment of cerebrovascular diseases involves the management of catheterization room, which has been studied carefully, and the corresponding management regulations have been formulated, focusing on the protection of medical staff. The protection of medical personnel entering the catheter room shall be the same as that of ordinary emergency personnel: wearing work clothes, work caps, medical protective masks, goggles/protective screens and disposable isolation clothes. Suspected patients who intend to enter the catheter room would be immediately upgraded to the protection level of the isolation area: wearing disposable medical protective clothing, wearing medical protective masks, goggles, wearing long shoe covers, wearing latex gloves. In recent years, in order to facilitate the operation, general anesthesias has been widely used in the endovascular treatment of aneurysms.
However, general anesthesia involves tracheal intubation. During the intubation, a large amount of airway secretion splashes, which increases the exposure risk of anesthesiologists and other staff. In fact, according to the experience of Professor Ma Lianting, the pioneer of endovascular treatment of aneurysms, low-grade aneurysms can be operated under local anesthesia. Therefore, for aneurysms of Hunt grade III or below, the patients who can cooperate with the patients should adopt local anesthesia operation, and prepared carefully before operation. The operators should simplify the operation as much as possible and shorten the operation time. For suspected cases, three-level protection strategy should be adopted.

The novel coronavirus infection expert of Chinese Medical Doctor Association neurointervention Expert Committee (including the author, etc.) discussed the recommendation of experts on prevention and control of new coronavirus infection (trial version), providing guidance for the development of cerebrovascular diseases during the epidemic period of COVID-19, a Chinese Medical Doctor Association expert in neurointervention.

For suspected patients in the general ward, Wang Xuan, etc. of Wuhan Union Medical College Hospital, etc. introduced a flow-based treatment, specifically:

1. Timely detection of fever patients.
2. For fever without definite inducement or obvious symptoms such as fever and respiratory tract, it is necessary to immediately transfer to the isolation ward of ordinary ward (single living and local isolation).
3. In case of suspected cases, network direct report shall be conducted within 2 hours, and the patients shall be transferred to the isolated area for standardized treatment, laboratory test and imaging examination. The diagnosis can be made according to the results of CT and clinical manifestations.
4. To assess the risk of contact between medical staff and other patients or caregivers, if they are judged as close contacts, isolation and medical observation should be taken immediately.

CONCLUSIONS

To sum up, as long as we fully improve our understanding of COVID-19, especially the characteristics of infection and the way of transmission, achieve early detection, early isolation, early treatment, fully upgrade the protection and theoretical training of medical staff, strictly control the admission, strengthen the management of patients and companions in the department, and improve the medical treatment process, we can scientifically, effectively and calmly respond to this second epidemic situation, ensure the normal operation of Neurosurgery diagnosis and treatment during the epidemic period.

At the time of writing, the vice chairman of Neurosurgery Branch of Wuhan Medical Association, a well-known neurosurgeon expert of Wuchang hospital fought at the front line, was died because infected COVID-19. It was pointed out that in the stage of fighting against the epidemic, it was still the key and difficult work to control hospital and protect the safety of medical staff, which was the basis and premise of carrying out neurosurgery during the epidemic period.

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