Expert Consensus on Clinical Practice of Burn Units in Shanghai During the COVID-19 Epidemic

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In response to coronavirus disease 2019 (COVID-19), the Shanghai Burn Clinical Quality Control Center organized experts to formulate and implement a set of rapid, simple, and effective prevention and control measures, and there have not been any cases of health care professionals or inpatients in burn units suspected or confirmed with COVID-19. This article elaborates on the specific measures in burn units in response to the epidemic, including the implementation of standardized procedures, remote consultations, strengthened follow-up, exchange of experience, and popular science, among others. We share experience from Shanghai to benefit related disciplines in other countries and regions.

Since the outbreak of coronavirus disease 2019 (COVID-19), Shanghai, one of the world's mega-cities, has been in a critical situation regarding the prevention and control of the epidemic. With an area of 6340.5 km^2, a population of 24.281 million people, and an external resident population as high as 40.27%,[1] Shanghai is a cosmopolitan city with a large migrant population including people entering Shanghai from other countries with relatively high frequency. Facing such a challenge, the city has taken a series of measures to ensure the safety of medical personnel and to meet the needs of various patients who must be treated specifically in outpatient units, emergency departments, and wards.

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In the initial stage of the outbreak, under the leadership of the Shanghai Municipal Health Commission, the Shanghai Burn Clinical Quality Control Center organized experts to formulate and implement a set of rapid, simple, and effective prevention and control measures in accordance with the relevant guidance documents for the prevention and control of the COVID-19 epidemic. This set of measures combines the particularities of Shanghai and the characteristics of burn specialists, such as exposure to burn wounds, a large number of accompanying family members due to mobility problems, pediatric burns that are prone to be complicated by fever, and the need for repeated outpatient medication changes, among others. The measures can help medical staff to identify suspected patients early, protect medical staff and patients in the hospital, and prevent the spread of the virus.[2]

The general principles of the prevention and control measures of Shanghai burn units are as follows: 1) for patients who are not critically ill or do not require emergency treatment, hospitalization should be delayed, while home treatment with a doctor's remote guidance, nearby treatment, or outpatient dressing change treatment are recommended; 2) for mild patients, diagnosis and treatment should be remote whenever possible; and (3) non-emergency surgery should be delayed. Surgery was best performed in steps, simply and quickly, without compromising the effect of the treatment, to prevent aggravation and reduce the exposure risk of medical staff. These prevention and control measures not only guaranteed that no medical staff in the burn department or hospital patients were diagnosed or suspected of being infected by COVID-19 during the epidemic but also improved the effect of burn care by implementing standardized procedures, remote consultations, strengthened follow-up, exchange of experience, popular science, and other measures. This paper focuses on diagnostic and treatment procedures as well as the prevention and control measures for patients in burn units during the COVID-19 epidemic.

WORK OF OUTPATIENT AND EMERGENCY DEPARTMENTS

1. The "one person, one room" principle should be strictly enforced in outpatient and emergency clinics of burn departments and other departments, where burn patients will be admitted to avoid patients and their families gathering. Temperatures should be taken before entering the room. Patients with fever that is clearly unrelated to the burn wound are advised to attend a fever clinic first (medical units without a fever clinic can suggest patients to go to the nearest fever clinic).
2. Doctors, nurses, and technicians attending burn outpatient and emergency clinics are required to wear work clothes, medical masks, medical disposable hats, and homologous medical gloves, for different operations, according to the standard prevention protocol. It is recommended that conditional units wear masks, goggles, and isolation clothes with a higher level of protection.
3. Outpatient or first emergency visit: Residence history and contact history in an epidemic area should be recorded and the body temperature should be taken. Patients with fever or a history of residence or contact with people in the infected area should be quarantined immediately and other medical consultations should be suspended, and the standard reporting protocols of the health care unit should be implemented (Figure 1), according to the *Chinese Clinical Guidance for COVID-19 Pneumonia Diagnosis and Treatment* (seventh edition).[3] The specific admission protocols for children aged 6 years and younger having severe burns and requiring hospitalization are shown in Figure 2. When judging whether to admit a patient to a designated hospital, computed tomography (CT) examination and nucleic acid testing are necessary for patients older than 6 years (Figure 1), while nucleic acid testing alone is necessary for children aged 6 years and younger (Figure 2).
4. Outpatient or return emergency visit: Patients should be informed of their exact time of arrival and precautions, and appointments should be made whenever possible. Patients with small-area burns are advised to change their own medication under the guidance of a doctor through the department's online platform, WeChat public account, department office phone, or other non-contact consulting methods.
5. Outpatient and emergency areas should be routinely disinfected every day in accordance with the disinfection standards during the prevention and control period of the epidemic after finishing daily clinical work.

WARD WORK

1. In accordance with the premise of fire safety management, access to the ward should be strictly controlled, all personnel's body temperature should be taken before entering the ward, and persons with fever should not be allowed to enter. Specialized wards should maintain,

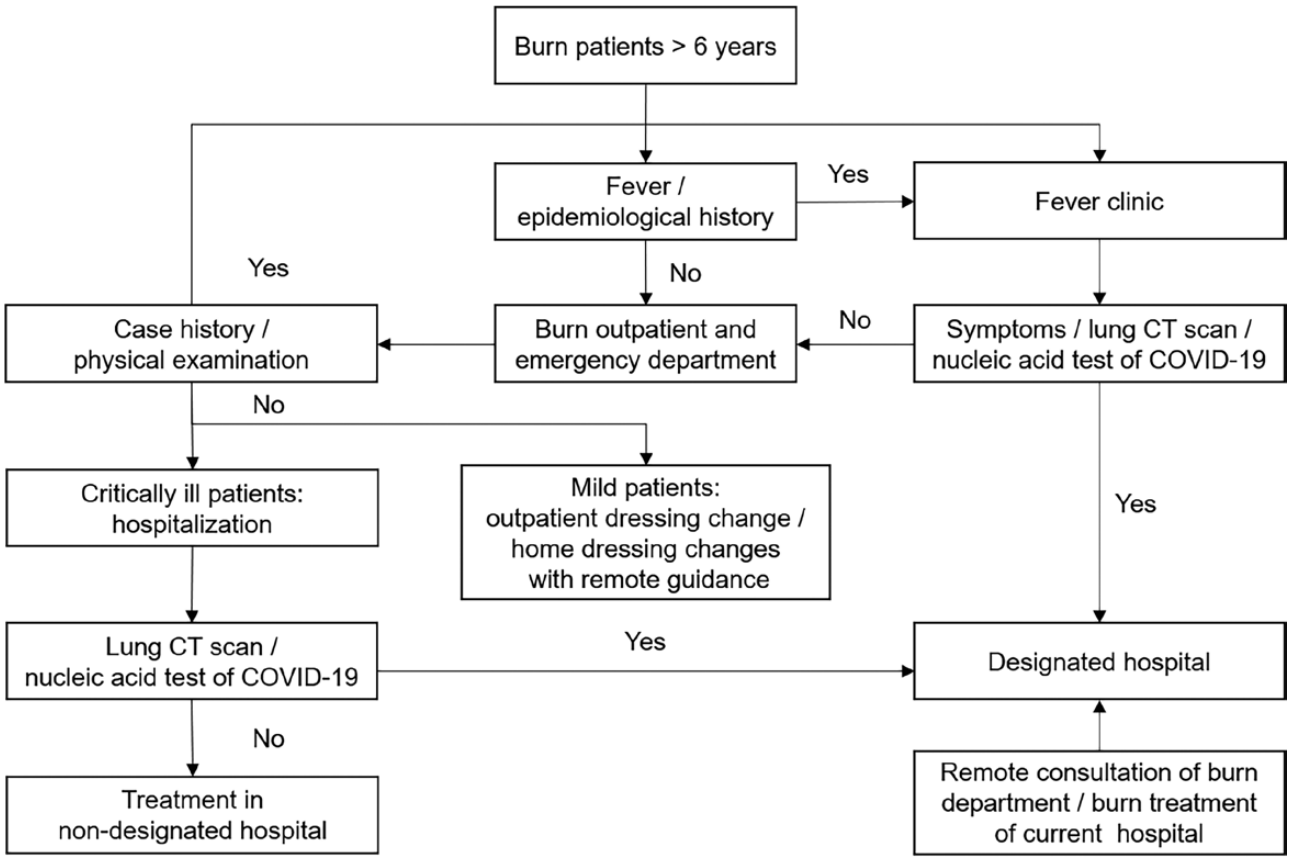

Figure 1. Admission protocols of patients in outpatient and emergency department during the COVID-19 epidemic.

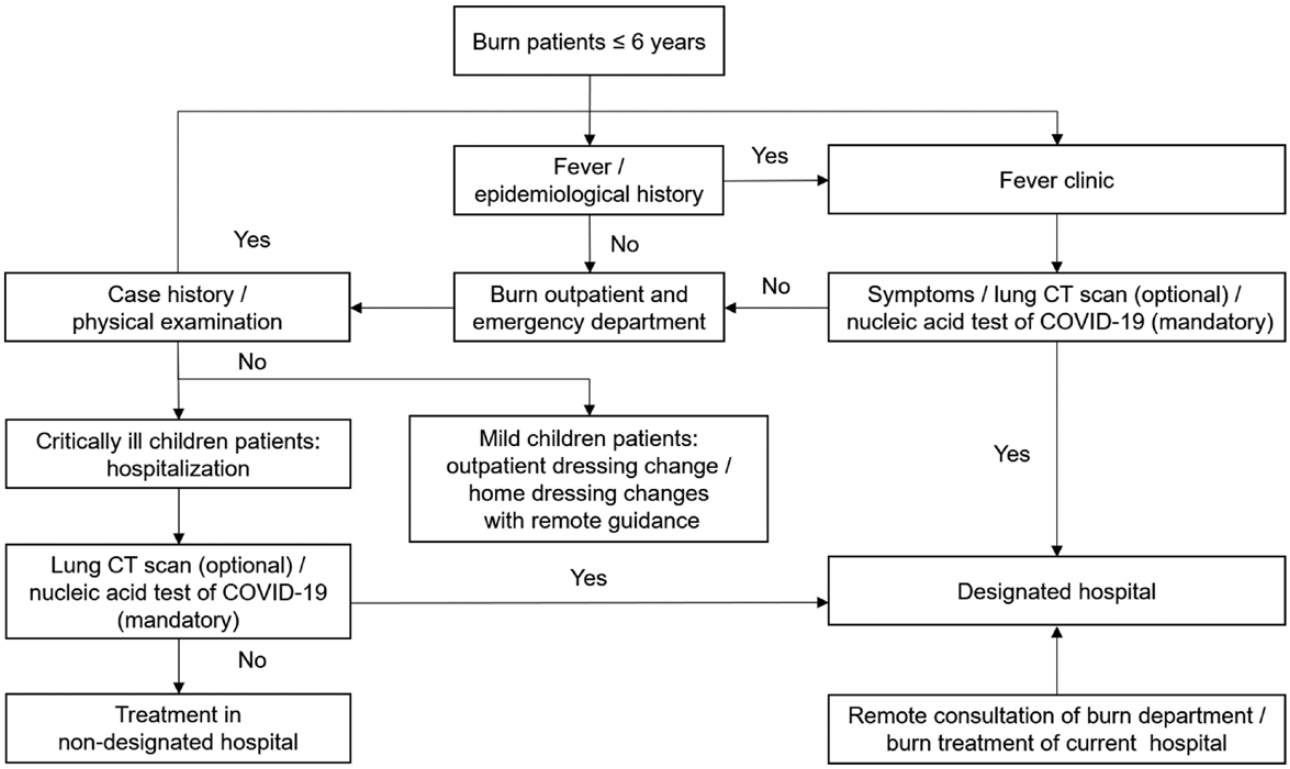

Figure 2. Admission protocols of children patients (≤6 years) in outpatient and emergency department during the COVID-19 epidemic.

as far as possible, regional separation between patients, depending on the admission of inpatients and the configuration of the wards. There should be strict management and self-protection of family chaperones and visitors in the ward, as well as good explanation and education.

2. Medical personnel in burn wards are required to wear medical masks and medical disposable hats in accordance with the standard protection protocol. Each medical unit, in accordance with its own situation, should rationally organize group work of shift meetings and ward rounds to minimize the occurrence of too many medical personnel concentrating in small spaces within a short time, so that the risk of virus transmission is minimized.
3. To strengthen the control of hand hygiene, disinfectant should be placed at the door of every ward and every dressing change room. Hand sterilization should be performed before and after entering and leaving the ward, before and after touching patients, and before and after medical operations.
4. Patients newly admitted to the hospital should be investigated for the following factors: history of residence in the epidemic area, contact history with people in the epidemic area, and fever. Those without the above conditions could be admitted according to the standard reporting protocols of the health care unit. For patients with fever and respiratory symptoms but without epidemiological history, COVID-19 nucleic acid testing and lung CT imaging should be completed to exclude the risk of infection before being admitted. For patients with fever whose epidemiological history cannot be confirmed, it is recommended to persuade the patients to go to a fever clinic or designated hospitals in Shanghai for treatment of COVID-19 infection first.
5. Patients with fever clearly related to a burn should have their body temperature and related conditions recorded and be treated in a timely fashion. Patients with fever caused by other causes should have a timely discussion of the condition by specialists in the department and, if necessary, seek guidance from specialists in the respiratory department, infectious disease department, and other relevant departments. Patients with fever that cannot be ruled out as a risk factor for COVID-19 infection should be immediately isolated and reported in accordance with standard reporting protocols of the health care unit, according to the *Chinese Clinical Guidance for COVID-19 Pneumonia Diagnosis and Treatment* (seventh edition).[3]
6. Central air conditioning in burn wards should be switched on and off in accordance with the Guidelines for the Operation and Management of Air Conditioning and Ventilation Systems in Offices and Public Places during the COVID-19 epidemic.[4] Wards should be disinfected daily in accordance with the disinfection standards of the clinical area for non-coronavirus-infected patients admitted during the COVID-19 epidemic issued by the State and Shanghai Municipality.

SURGICAL WORK

1. For patients undergoing emergency surgery for burns, preoperative examinations and preparation are necessary in accordance with the recommendations for prevention and control in the medical unit. Temperature changes should be dynamically monitored for 2 weeks postoperatively and the lungs should be assessed daily for abnormalities. If fever and pulmonary abnormalities with no clear cause are found, the patient should be isolated and cared for in accordance with the standard protocols of the medical unit and reported to the hospital's epidemic prevention department.
2. Patients undergoing elective surgery for burns should undergo their preoperative examinations. For patients with fever, chest CT examination should be completed, and virology testing should be completed as much as possible in units available. For patients with fever with abnormal chest CT, departmental experts should be organized to discuss the case, relevant experts in the respiratory and infectious departments should be invited for consultation, and patients for whom the risk of infection is ruled out can undergo surgery as planned. Those for whom infection cannot be ruled out should have surgery suspended and be cared for and reported in accordance with the standard procedures of the medical unit in which they are located.
3. Burn surgeons should wear surgical hats and surgical masks in accordance with basic protection requirements, and wear goggles to enhance self-protection in accordance with the needs of the surgery and the security capacity of the medical unit.

FOLLOW-UP OF DISCHARGED AND REHABILITATED PATIENTS

Patients discharged from the burn department must be followed up and informed of the exact follow-up time and out-of-hospital protection points at the time of discharge. Burn rehabilitated patients who require long-term outpatient follow-up should be informed by telephone or other methods of the follow-up time and protection points. Non-mandatory outpatient visits are advised to complete follow-up and clinical rehabilitation work through the department's online platform, WeChat public account, department office phone, or other non-contact consulting methods.

ORGANIZATION OF MEETINGS FOR VOCATIONAL STUDY, CONSULTATION, AND EXPERIENCE EXCHANGE

During the epidemic, it is recommended to use the Internet or the WeChat public platform to promote the dissemination of paperless and non-contact learning materials, when burn departments and medical units conduct burn diagnoses, treatments, and vocational studies. Experience exchange, mass burn casualty treatment, complicated case consultation, and other necessary collective activities are recommended to use WeChat, DingTalk, Tencent meeting, Zoom, or other applications and software with multi-party call and meeting functions.

MEDICAL KNOWLEDGE POPULARIZATION AND EDUCATION

During the epidemic, burn departments and medical units conducting burn treatment can make use of opportunities such as outpatient and emergency treatment and ward rounds to disseminate knowledge about first aid, treatment, and rehabilitation for burns to patients and their families, according to the actual situation of the unit, and relevant knowledge can be disseminated through network platforms and WeChat public accounts. Based on clinical experience, qualified doctors can disseminate burn prevention and first aid knowledge when field work is necessary and recommend isolating and working at home with foreseeability.

CONCLUSIONS

Because the outbreak of COVID-19, all burn treatment units in Shanghai have received and dealt with patients in accordance with the above measures, and there have been no cases of medical personnel or in-hospital patients in burn units suspected or confirmed to have COVID-19. Burn treatment continues to work smoothly and safely in this international megalopolis.

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