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Management of urology during COVID-19 pandemic: A perspective from Sichuan Province, China

1. Background

Since first reported in Dec. 2019 in Wu Han, China, Novel Coronavirus has captured most cities in China. On Feb. 1, 2020, National Health Commission of the People’s Republic of China (NHCC) officially termed the novel coronavirus as COVID-19, which is in accordance with World Health Organization (WHO). Until 14:35, Feb, 21, the number of diagnosed cases was 76,178 and 2247 died, among which 75,568 and 2239 were reported in China respectively with an estimated mortality of 2.9%. Though mortality of this newly emerging coronavirus could be lower than SARS, the mortality of which was reported to be about 9.6%, COVID-19 is highly contagious. In latest days, an explosion of Novel Coronavirus epidemic was reported in Japan and South Korea. Concerns was lifted that there might be an outbreak in Southeast Asia and it would take a long time before taking this epidemic in control. Hospital was an important crowd gathering point during the epidemic or not and most of the visitors are at old age with existing illness. It is impossible to decline reception of patients, especially for those with tumor and trauma who need to be treated through surgery. A comprehensive introduction of management strategy in urology department of West China Hospital during COVID-19 epidemic was summarized in this article, through which we hope could provide reference for other medical centers.

2. Basic protection knowledge during COVID-19 epidemic

According to the “Diagnosis and treatment Scheme of Novel Coronavirus Pneumonia (Version 6.0)” [3], the basic knowledge acquainted by all caregivers is presented in Table 1.

3. Patient management

3.1. Difficulties in current diagnosis and treatment of urological patients

Fever is one of the main clinical manifestations of new coronavirus pneumonia, so it is needed to distinguish from fever-related diseases in urology. Some patients are asymptomatic or intend to conceal epidemiological history at the time of consultation. These uncertainties will bring some difficulties to the diagnosis and treatment of patients, meanly bring certain risks to the health and protection of urological medical staff. Most patients with urological tumors are elderly people, and are frequently accompanied with underlying diseases related to the respiratory system and cardiovascular system, which increase the risk of surgery. The normal diagnosis and treatment of cancer patients are often forced to be suspended or discontinued leading to an increased risk of worsening the disease due to the impact of this epidemic. Psychological tolerance of such patients is usually poor, and they are more likely to suffer from emotional disorders causing by the deterioration of the disease or failing to go through the admission procedure in time, which makes the doctor-patient relationship more tense. In addition, if such patients are combined with new coronavirus pneumonia, the risk of infection and perioperative mortality will greatly increase. Therefore, how to maximize patient rescue work on the basis of ensuring epidemic prevention and control is the focus and difficulty of our current work.

3.2. Patient and family management

**Principle:** Strengthen the first diagnosis responsibility system, early detection, early diagnosis and timely isolation of suspected COVID-19 patients. The specific measures are as follows.
## Table 1
The basic knowledge acquainted by all caregivers.

| Epidemiological features | Infection sources | Patients with confirmed COVID-19 infection are the main source of infection. Asymptomatic COVID-19 infection can also become the source of infection. |
|--------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Transmission routes      |                   | The virus is mainly transmitted via droplets respiratory and close-contact. People are susceptible to infect through aerosols when constant exposed to high-concentration aerosol in a relatively closed environment. COVID-19 is prone to transmit in humans. |
| Susceptible population   |                   | Patients with confirmed COVID-19 infection and patients with mild clinical symptom shows no imaging features of pneumonia; |
| Diagnostic criteria      | Suspected cases | (1) History of travel to or residence in or around Wuhan, China or other cities with confirmed cases in the last 14 days before symptom onset; |
|                          | Epidemiology history | (2) History of contact with confirmed COVID-19 cases which the nuclear acid test is positive in the last 14 days before symptom onset; |
|                          |                   | (3) History of contact with patients with fever or respiratory symptoms from Wuhan and adjacent district or other cities with confirmed cases in the last 14 days before symptom onset; |
|                          |                   | (4) Clustered onset; |
|                          |                   | (1) Fever and/or respiratory symptoms; |
|                          |                   | (2) Typical imaging features of COVID-19; |
|                          |                   | (3) Reduced or normal white blood cell count, or reduced lymphocyte count in the early stage of the disease onset; |

### Clinical features

| Confirmed case | (1) The real-time PCR test for COVID-19 nucleic acid is positive; |
|               | (2) The viral gene sequencing presents highly homogeneity to the known COVID-19; |
|               | Suspected cases with one of the above pathogenic evidence are considered as the confirmed cases; |

| Mild classification | Patients with mild clinical symptom shows no imaging features of pneumonia; |
| Moderate classification | Patients experience fever or respiratory symptoms while the imaging features are pneumonia; |
| Severe classification | (1) shortness of breath, respiratory rate (RR) < 30; |
|                       | (2) Pulse oxygen saturation<93% in resting situation; |
|                       | (3) Alveolar oxygen partial pressure (PaO2)/Fraction of inspiration oxygen ≤300 mmHg; |

| Table 1 (continued) | (4) Patients with imaging features which lesions are markedly progressed >50% in 24–48 hours are considered as the severe patients; |
|                     | Critical (1) Mechanical ventilation should be given to patients with hypoxic respiratory failure; |
|                     | (2) Shock; |
|                     | (3) Patients should be admitted to ICU when combine with multiple organ failure; |

1. Set up checkpoints in the outpatient area. All patients should wear masks, hats, take body temperature, disinfect their hands, and fill out the “Outpatient Epidemiology Declaration Form” (Fig. 1) before entering the consultation room. Fever patient should be led to the fever clinic for screening.
2. For suspected cases, a blood routine and high-resolution CT of the chest are needed for screening before deciding whether to admit. Suspected NCP patients should be sent to the fever clinic;
3. Gradually treat patients in batches. Newly admitted patients and their families are all required to wear masks and monitor body temperature, and the education of epidemic prevention and patient mental health is also necessary.
4. Each patient admitted must complete the “Suspected Cases of New Coronavirus Pneumonia Screening Form” (Table 2). For the suspected patients after being hospitalized, the medical team leader should ask for the medical experts’ consultation on the same day to determine whether further examination and isolation are needed (Fig. 2).
5. Prefer One patient per ward. Only one fixed family member is allowed for each patient, and a companion certificate should also be provided.
6. Set checkpoints at the elevator entrance of the department. All visitors take temperature measurements and records. Health certificates issued by local epidemic prevention units are required for the accompanied family members.
7. Reserve 2 rooms as emergency isolation wards for suspected cases not meeting the criteria but require further investigation. Isolation wards are staffed to prevent cross-infection among medical staff.
8. Patients and their families order meals in the hospital cafeteria. Food delivery is not allowed.
9. Combined education forms of verbal and written form will be used before discharged. Visit the clinic online for post-operative review are encouraged to avoid crowded public transportation.

### 3.3. Telemedicine

Oncologic patients are at about an over 3-fold risk of contagion during this unprecedented pandemic outbreak [4]. To reduce the risk of infection, principles including enhancing immunity, avoiding using agents suppressing immunity and reducing contact should be kept in the period. Considering the vulnerability caused by cancer treatments, the unknown effects of procrastination of tumor surgeries or therapy, and the risk of current limited medical resources, Gambardella et al. [5] advocates that risk of stratification of patients based on frailty analysis of Comprehensive Geriatric Assessment is of utmost importance. They classify cancer patients into fit, unfit and frail, and the patients are considered frail if they are at high risk of toxicity and all treatments are recommended to be avoided or delayed [5]. Special attention was paid in reduction the hospital attendance, through the delay of non-urgent counselling, the adoption of a predmission telephone triage, and the implementation of telemedicine [5,6]. The COVID-19 pandemic not only procrastinates the treatment of a large number of patients, but also...
puts hospital personnel at a high risk of infection and a potential vehicle for the transmission of COVID-19. Large number of infected patients, the asymptomatic infected subjects, and the lack of personal protective equipment are heavily contributing to the collapse of the healthcare system [6]. In this situation, a simple and reproducible triage procedure and telemedicine play a crucial role in avoiding crowds in hospitals, and in reducing the unnecessary contact with the physicians [6].

### 3.4. Management of confirmed and suspected cases

1. Diagnosed COVID-19 patients was received for treatment in the first isolation ward.
2. Suspected COVID-19 patients was received for treatment in the second isolation ward.
3. Patients don’t meet the criteria for suspected case but need further examinations for exclusion is isolated in separate room. Already received patients should be isolated in the urinary ward and other patients will receive triage in emergency department.
4. Patients who are in life-threaten condition should be rescued in the emergency fever rescue room. According to the post-rescue condition of, patients will be sent to the second isolation ward or ICU negative ward for further treatment.

### 3.5. Ward management

1. Ventilation is scheduled at11:00AM and 4:00PM every day with a duration of 30 minutes.
2. As is reported COVID-19 could be transmitted between humans in gastrointestinal pathway [7], office materials including keyboard, clipboard, pen and other hand-touching materials should be disinfected by 75% alcohol twice a day.
3. All kinds of takeaways are prohibited, and patients and their companions are prohibited from dining together.
4. Teaching ward-round was canceled and doctors must correctly wear mask and protective glass during ward-round.
5. Because many exits are closed in this period, fire safety should be noted with attention and all kinds of high-power electrical appliances was forbidden in the ward. The number of patch board should be reduced and the condition of fire facility should be checked with cautiousness.

### 3.6. Management of surgery

Principle: Emergency and limited-time surgery are preferred, and elective surgery is not considered temporarily.

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**Outpatient Epidemiology Declaration Form**

| Name: | Gender: | Age: | Axillary temperature: |
|-------|---------|------|----------------------|
|       |         |      |                      |

| ID number: | Address: | Telephone: |
|------------|----------|------------|
|            |          |            |

1. Whether the patients and their families have travel or residence history in Hubei, Chongqing, Guangzhou and other areas within 2 weeks.
   - Yes ☐ No ☐

2. Whether the patients and their families have been exposed to patients with fever, cough and other symptoms from Hubei and other epidemic areas within 2 weeks
   - Yes ☐ No ☐

3. Whether the patients and their families have been exposed to patients suspected or diagnosed with 2019-nCoV within 2 weeks
   - Yes ☐ No ☐

4. Whether to participate in meals and parties with unfamiliar people within 2 weeks.
   - Yes ☐ No ☐

5. Have you had any symptoms such as fever, cough, chest distress, chest pain, air tightness in recent 3 days, or diagnosed pneumonia within 2 weeks.
   - Yes ☐ No ☐

6. Whether to take high-speed rail, aircraft and other closed vehicles within 2 weeks
   - Yes ☐ No ☐

7. Whether 2 or more relatives, friends and colleagues have fever or cough within 2 weeks.
   - Yes ☐ No ☐

Outpatient District: Signature (patient): Date:

Signature (nurse): Signature (doctor):

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Note: According to the relevant judicial interpretations of the Supreme People's court, the Supreme People's Procuratorate, “law on the prevention and control of infectious diseases” and “law on administrative penalties for public security”, you may face public security detention, fine and even legal liability for crimes against public security if you conceal the above situations or refuse to be isolated.

**Fig. 1.** Outpatient epidemiology declaration form.
Selective operations are canceled during the epidemic.

Limited operation could be postponed if there are other conservative therapies which have comparable effects in disease control and efficacy. For patients with urinary obstruction, therapies aimed to relieve the condition of obstruction should be on the top of priority.

For patients diagnosed with mid-stage or late-stage malignant tumor, neo-adjuvant chemotherapy should be recommended if MDT discussion think applicable. If the patient and his or her relatives agree with the strategy, neo-adjuvant chemotherapy and operation will be performed after the epidemic be put under control. For patients who are expected to benefit limited efficacy from neo-adjuvant chemotherapy or disagree with this strategy, operation could be performed when all the related risk was agreed by the patient and relatives.

### Table 2

**Suspected Cases of New Coronavirus Pneumonia Screening Form**

| Epidemiological history                                                                 | Results |
|----------------------------------------------------------------------------------------|---------|
| ① Whether there is travel or residence history of Hubei Province within 2 weeks         | Yes □  No □ |
| ② Have you contacted any person from Hubei Province within 2 weeks, and have they got fever or other symptoms | Yes □  No □ |
| ③ Have you been exposed to a new coronavirus infection within 2 weeks (positive nucleic acid test) | Yes □  No □ |
| ④ Are there people living with novel coronavirus infection in the residential area? | Yes □  No □ |
| ⑤ Have your close friends and relatives had fever or respiratory symptoms within 2 weeks? | Yes □  No □ |
| ⑥ Is there a history of personnel gathering within 2 weeks                              | Yes □  No □ |

| Clinical manifestation | Results |
|------------------------|---------|
| ① Fever within 2 weeks  | Yes □  No □ |
| ② Respiratory symptoms (mainly dry cough) | Yes □  No □ |

| Laboratory findings                        | Results |
|--------------------------------------------|---------|
| ① Normal or decreased leukocyte count      | Yes □  No □ |
| ② Decrease of lymphocyte absolute value   | Yes □  No □ |

| Reports of chest CT                  | Normal □  Abnormal □, findings: |

2. Whether to consult: Yes □  No □

Signature (resident): Signature (superior physician): Date:

3. Results of expert or expert group: no considering □ suspected □ highly suspected □

4. Management of suspected case: the patient will be isolated in a single room immediately in the original department, and then sent to a fever clinic to collect a swab.

5. Treatment of highly suspected cases: the patient will be transferred to an isolation ward immediately and sent to a fever clinic to collect a throat swab. After exclusion, he or she will be transferred to a specialist to continue treatment.
3. Patients with trauma and other emergency conditions meet the criteria for emergency operation should be tested for temperature, chest x-ray and traditional preoperative examinations. Once the possibility of suspected infection was excluded, operations should be performed as the standard protocol. As for suspected infectious patients, any invasive examination or operation must be performed in negative pressure operation room and doctors should be strictly protected. Concerned the possibility that postoperative condition could be worsen by the concomitant Coronavirus infection, it is suggested to be more conservative in making the treatment strategy, especially for patients who are at an old age or have severe comorbidities. For patients with urinary obstruction, indwelling catheter, bladder fistula and other treatments alleviating obstruction are recommended. Radical operation is expected after the epidemic be in control.

4. A fixed room was set for preoperative communication. Privacy of patients should be strictly protected during the communication. A pen fixed on the table is prepared for signing and a designated staff was responsible for the disinfection of all the materials in the room. Pen of the doctors should not be used by patients and their relatives.

3.7. Protection of caregivers

1. Individual protection: In order to minimize the chance of exposures to COVID-19, the medical workers need to adopt the first-class protection. All the participants need to correctly use the personal protective equipment, such as medical protective clothing and protective masks, disposal shoulder caps and gloves. In addition, hand hygiene practices are another important prevention tool, which the medical stuffs need to wash hands or
perform hands disinfection before or after perform a physical examination to every patient. Efficient chemical disinfectant includes 75% ethanol, chlorinated disinfectant, peracetic acid and things like lipid solvent. But chlorhexidine could not be effectively inactivating the virus.

2. Return-to-work: With the front-line workers back to work from other provinces, they need to comply with home quarantine for 14 days.

3. Ward entrance: Clinical worker and patients must conform the guidance management of ward entrance and elevator. They can only make an appointment in advance, and visit the ward for treatment forbidden to treat in the wards. Special circumstances such as only can make a consultation in the outpatient department. It was before entering the wards. Outpatients and discharged patients entrance, and all need to check the temperature and register wristbands and family members with escort cards. A temperature check will be performed once a day. In case of fever, fatigue, dry cough and other upper respiratory symptoms, or nasal obstruction, runny nose, diarrhea, etc., the staff shall carry out new crown nucleic acid detection and chest CT, and report the suspected lesions immediately and send them to the isolation ward for observation and treatment.

4. Management of staffs. Mask should be correctly wore during work. All kinds of pick-up were forbidden. When eating, staffs should be in a row wearing their own suits and not eat at the same time. People should be care of the manner of coughing and the hygiene of hands. Moreover, staffs should avoid touching mouth, nose and eyes with hands. Report of the physical condition of themselves and their fellow residents in WeChat group is required once a day. In case of fever, it should be reported to the office immediately.

5. Management of entrance guard: People should conform 24-h access control strictly. Patients can only enter the wards with wristbands and family members with escort cards. A temperature detection point should be set up at the elevator of the patient entrance, and all need to check the temperature and register before entering the wards. Outpatients and discharged patients only can make a consultation in the outpatient department. It was forbidden to treat in the wards. Special circumstances such as patients with bladder perfusion chemotherapy drugs need to make an appointment in advance, and visit the ward for treatment in turn.

6. Shift and ward rounds: Doctors and nurses on duty should report ward dynamics and key patients in WeChat group at the shift before 8:00am, and then nurses and doctors make the shift separately. All medical groups were divided into groups and checked at different time.

7. Environment management: The nurse station and office should remove unnecessary materials to keep the area clean and tidy, which is conducive to cleaning and disinfection. The office and duty room should be ventilated by opening windows or doors as much as possible, and 2–3 times a day which lasts for 30 minutes each time.

3.8. Psychological adjustment of medical staff

Principles: maintain a normal pace of life; adjust a good psychological status; friendly and supportive social favor; seek professional psychological help [8]. Specific steps are as follows:

1. Reasonable analysis of the reasons for emotions: limited staff and complicated work; dual pressures of physical strength and energy; pressure from patients and family members; lack of medical protection supplies; complete worry about family members and themselves.

2. Recognize and accept your emotions correctly: During the epidemic, medical staff are in a state of high workload for a long time, physically and mentally exhausted, and the doctor-patient relationship across the country is very tense, which will inevitably produce emotions such as irritability, worry, fear, anger and even helplessness. We should accept the existence of emotions, and take appropriate adjustment measures according to our own conditions, such as communicating more with others, encouraging each other, and even seeking help from a psychologist.

3. Actively adjust your physical and mental state: help you adjust your emotions in various ways, including diverting your attention (such as listening to music, watching movies, etc.), abdominal breathing, progressive muscle relaxation exercises, meditation, hot baths, etc.; In time, get accurate information and solve problems based on emotions.

4. Conclusions

The epidemic of COVID-19 threatens not only China, but also global health. For patient and family management, we should strengthen the first diagnosis responsibility system, early detection, early diagnosis and timely isolation of suspected COVID-19 patients. For management of surgery, emergency and limited-time surgery are preferred, and elective surgery is not considered temporarily. Furthermore, the personal protection and psychological adjustment of hospital personnel are also of utmost importance.

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The authors have nothing to disclose.

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References

[1] Notice of the national health and health commission on revising the English naming of new coronavirus pneumonia, Access from, http://www.nhc.gov.cn/xcs/syjews/wj202002/ed67614b35244caab1179d5a03dc2b4861.shtml.
[2] Dingxiang Garden, Real-time dynamics of new coronavirus pneumonia. https://ncov.dxy.cn/ncovh5/view/pneumonia?from=dxmh5.
[3] National Health and Medical Commission, Diagnosis and Treatment Scheme of Novel Coronavirus Pneumonia, 2020-02-19, Version 6.0.
[4] K.H. El-Shakankery, J. Kefas, S.M. Crusz, Caring for our cancer patients in the wake of COVID-19, Br. J. Canc. 123 (1) (2020 Jul) 3-4.
[5] C. Gambardella, R. Pagliuca, G. Pomilla, A. Gambardella, COVID-19 risk contagion: Organization and procedures in a South Italy geriatric oncology ward, 30237-X, J Geriatr Oncol S1879–4068 (20) (2020), https://doi.org/10.1016/j.jgo.2020.05.008 (Epub ahead of print).
[6] S. Tolone, C. Gambardella, L. Brusciano, G. Del Genio, F.S. Lucido, L. Docimo, Telephonic triage before surgical ward admission and telemedicine during COVID-19 outbreak in Italy. Effective and easy procedures to reduce in-hospital positivity, Int. J. Surg. 78 (2020) 123–125.
[7] M.L. Hofshue, G. DeBolt, S. Lindquist, et al., First case of 2019 novel coronavirus in the United States, N. Engl. J. Med. (2020), https://doi.org/10.1056/NEJMoa2001191 [Epub ahead of print].
[8] Sichuan Science and Technology Press. A Handbook of Popular Psychological Protection for New Coronaviruses.

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