Invited Symposia

An outbreak of Severe Acute Respiratory Syndrome in a nursing home: Lessons to learn

Wency W Ho, Elsie Hui, Timothy Kwok and Jean Woo

Department of Medicine and Therapeutics, Division of Geriatrics, The Chinese University of Hong Kong, Hong Kong

Hong Kong experienced an epidemic of Severe Acute Respiratory Syndrome (SARS) from March to June 2003. Nursing homes were a potential area of cross-infection because of the crowded living space, substandard environmental hygiene, inadequate ventilation, low working staff to resident ratio, and staff who lacked knowledge of infection control. The mortality in elderly SARS patients was high because of their atypical presentations, their multiple comorbidities, and that they are more susceptible to the side-effects of treatment. The community geriatric assessment team need to work closely with the hospitals and the primary health care system to provide surveillance of the disease, infection control, and management of sub-acute clinical problems, in order to reduce unnecessary hospital admissions in nursing home residents during an epidemic outbreak.

Keywords: Hong Kong, Severe Acute Respiratory Syndrome, infection control, epidemic outbreak.

Severe Acute Respiratory Syndrome (SARS), a newly recognized infectious disease caused by a novel coronavirus, is thought to have originated from Southern China in November 2002. It spread to several countries, and resulted in more than 8000 cases and 750 deaths worldwide. In Hong Kong, a total of 1755 people were infected from March to June 2003. Of this number, 325 were elderly people and 72 of them were aged-home residents. The outcome was poor for these elderly, with 52 (72%) eventually dying. Compared with the overall mortality in all age groups (17%), the mortality was much higher in the nursing home residents. I would like to describe a cluster of epidemiologically-linked cases of SARS that happened in a nursing home in Hong Kong during the SARS crisis, in order to illustrate the underlying cause of high mortality in this group of patients.

The nursing home involved was typical of many privately run institutions of its type in Hong Kong. The nursing home was situated on the second floor of an old building in a suburban area with an unpleasant surrounding environment. It was adjacent to an open market selling fish, meat and vegetables and on the opposite side, there was a garbage collection station. The nursing home was divided into seven cubicles of 12 m² each by wooden partitions of 1.2 m high. Each cubicle was crowded with four beds with a living space of less than 3 m²/resident. Toilet commodes were placed next to the bed in each cubicle, for frailer residents. No single room was available for isolation purposes. The staff to resident ratio was approximately 1 : 14, and the majority of resident staff had no formal training in health care and infection control.

Table 1 illustrates a cluster of epidemiological-linked cases of SARS that happened in the nursing home during the crisis in Hong Kong in April 2003. Case 1, who was likely to be the index patient, was discharged back to the nursing home while infected with SARS during a hospital stay, and spread the disease to the other residents and working staff in the nursing home, and subsequently to the community via visitors. Three out of the seven patients died during the outbreak.

Nursing home residents, because of their frailty and comorbidities, are frequent users of hospital services, including casualty and acute wards, thus increasing their risk of exposure to infective agents in hospitals. As coronavirus is spread by droplets, through direct and indirect contact, an institutional setting is a high-risk area for the spread of SARS due to over-crowding and...
Table 1  A cluster of cases with confirmed Severe Acute Respiratory Syndrome at a nursing home in April 2003

| Case number | Sex/age | Status in Nursing Home | Date of onset of Illness | Probable mode of transmission | Outcome |
|-------------|---------|------------------------|--------------------------|-------------------------------|---------|
| 1           | Female/87 | Yes                    | April 12                | Likely to have been infected by a nurse during a recent admission (April 4–8), when there was an outbreak on the ward. | Recovered |
| 2           | Female/81 | Yes                    | April 13                |Exposed to Case 1 in NH between April 8 and 12. | Died on Day 13 |
| 3           | Female/65 | Yes                    | April 15                |Exposed to Case 1 in NH between April 8 and 12. | Died on Day 37 |
| 4           | Male/28   | Yes                    | April 15                |Case 1’s grandson. Exposed to Case 1 while visiting her at NH between April 8 and 12. | Recovered |
| 5           | Male/27   | Yes                    | April 18                |Another grandson of Case 1, and Case 4’s younger brother. Exposed to Case 4 and possibly Case 6 via household contact. | Recovered |
| 6           | Male/88   | Yes                    | April 19                |Case 1’s husband. Exposed to Case 1 while visiting her at NH between April 8 and 12. Also lived with Cases 4 and 5. | Recovered |
| 7           | Female/93 | Yes                    | April 25                |Admitted to a ‘fever’ ward with fever and clinical features of heart failure on April 16. Initially improved with diuretics and antibiotics. Developed fever again on Day 9, subsequently confirmed to have SARS, probably acquired on ‘fever’ ward. | Died on Day 20 |

NH, nursing home.

inadequate isolation facilities. During the SARS crisis, patients, in particular nursing home residents, admitted to hospital who had been excluded from having SARS but having either direct or social contact with any suspected or confirmed SARS cases, had to be quarantined in the ‘step down’ ward for at least 10 days. Following discharge back to the nursing homes, most of the residents continued to cohort in the side rooms. However, most of the nursing homes had no isolation rooms or any related facilities. For the nursing home described, patients were isolated in one of the cubicles sited at the corner with the use of an electric fan and opened windows to facilitate ‘better ventilation’. Patients’ relatives were not allowed to visit the cohort patients but this was often ignored.

Prior to the outbreak, nursing home staff lacked infection precaution measures, such as frequent hand washing and the wearing of face masks or shields. They also lacked knowledge in early detection of the disease before it spread quickly in nursing homes. Moreover, sharing of medical equipment like sphygmomanometers and oximeters among patients may be a source of viral spread. Elderly, who are cognitive impaired and lack safety awareness, are often reluctant to wear surgical face masks which endanger him/herself and others’ lives. Some of them may behave poorly, for example, spitting, touching with hands after contact with their own nasal and oral secretions, urination at the bedside etc. Thus, this would pose a higher chance of disease spreading quickly in nursing homes.
The elderly were ‘victims’ during the SARS outbreak. The disease may be easily under-diagnosed in elderly people because of atypical presentations, masking of the clinical manifestations with their comorbidities, and poor cognition to complain of illness. During the crisis, high-risk close-contact nursing procedures such as sputum suction, insertion of nasogastric tubes, and wound dressing, were limited. Rehabilitation services offered by physiotherapists and occupational therapists, was nearly abandoned. In contrast, relatives were not allowed to visit nursing home residents during the SARS crisis. They were not encouraged to attend regular government out-patient clinic visits. Community nursing visits were limited and social activities were markedly reduced in the nursing home also. Moreover, SARS may pose a psychological stress to the elderly. Through fear of cross-infection, they would be afraid to attend social activities. They would feel anxious and worried of hospital admissions and also clinic attendance. As relatives were not allowed to visit them during hospitalization, they would feel lonely, as though being abandoned. In some cases it may exacerbate major depression.

The outcome was poor in elderly SARS patients. Limited pharmacological therapy was offered to the elderly because of their multiple comorbidities and susceptibility to side-effects of treatment. Limited critical care was offered to them also. Physicians generally consider older patients’ quality of life worse than younger patients. Threshold for life-sustaining treatment in the elderly will be subjected to many ethical, legal, and socioeconomic dilemmas. Because of the limited resources and insufficient protocol to guide the physicians, very few elderly patients received critical care and ventilatory support in the Intensive Care unit. As a result, the mortality was much higher in elderly SARS patients.

So what can we geriatricians do to combat future epidemics, in particular the spread of the disease in institutions? For elderly homes, close collaboration and communication with the community geriatric assessment team, hospitals and the primary health care system, are essential to the surveillance of the disease in the older population. The community geriatric assessment team, composed of geriatricians, on-site visiting medical officers, and nurses, will act as an excellent role to provide support to nursing homes. The team will improve surveillance by performing close monitoring of nursing home residents discharged from hospital. They also work closely with the Department of Health to provide up-to-date information to nursing homes afflicted with SARS on infection control and proper techniques in routine care and high risk procedures, for example suction, feeding, bathing and handling of excrements. They provide consultation and management on sub-acute medical problems, in particular, febrile patients in institutions in order to prevent unnecessary and inappropriate hospitalizations. Fever of any cause should be closely observed and investigated. Although, people can start to think that the public health system will not be able to cope with outbreaks as it is unlikely to be possible to isolate everybody who has febrile illness and upper respiratory tract symptoms that mimic SARS. The challenge will be to maintain a sufficient level of surveillance while ensuring that the common cold does not override common sense. A rapid diagnostic test with high sensitivity remains the important key to lessening the burden of fear and economic impact. As symptoms of influenza might mimic SARS in the early stage, influenza vaccine should be offered to all nursing homes residents, including the working staff, during epidemic seasons in order to decrease the need for hospitalization and to eliminate misdiagnosis and over-diagnosis of SARS. Moreover, during a SARS crisis, it is equally important to closely monitor the health condition of the working staff and advise them to refrain from duty if fever and other symptoms suspected of SARS appear. Nursing homes should also keep an information record of visiting relatives for contact tracing and surveillance.

Conclusion

SARS appears to be a highly but not uniformly contagious disease, occurring in clusters in hospitals, as well as residential homes. Older people tend to be frail, with multiple comorbidities, rendering them more susceptible to infectious disease. At the same time, they are at greater risk of exposure to the disease, because of their frequent use of hospital services. The spread of infectious disease within hospitals and nursing homes is a public health concern. Therefore, the most effective way of preventing the disease spread is to avoid hospitalization. Close collaboration among the community geriatric team, Department of Health, and nursing homes is of vital importance to manage their problems in the nursing home as much as possible and to provide early detection of the disease to prevent a rampant spread.

Clinical features in the elderly are less prominent and the mortality is high. Thus, the diagnosis of SARS in older people requires a high index of suspicion. Hopefully in the future, better understanding of the disease, with earlier recognition and more effective therapy, may improve the clinical outcome in geriatric people.

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