



The COVID-19 pandemic: challenges in providing supportive care to those with cardiovascular disease in a time of plague

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Purpose of review

COVID-19 has permeated the very essence of human existence and society and disrupted healthcare systems. The attrition stemming from this highly contagious disease particularly affects those rendered vulnerable by age and infirmity, including those with underlying cardiovascular disease. This article critically reviews how best to integrate supportive care into the management of those affected.

Recent findings

Numerous studies have described the pathophysiology of COVID-19, including that specifically arising in those with cardiovascular disease. Potential treatment strategies have emerged but there is limited guidance on the provision of palliative care. A framework for implementation of this service needs to be developed, perhaps involving the training of non-specialists to deliver primary palliative care in the community, bolstered by the use of telemedicine. The appropriate use of limited clinical resources has engendered many challenging discussions and complex ethical decisions. Prospective implementation of future policies requires the incorporation of measures to assuage moral distress, burnout and compassion fatigue in healthcare staff who are psychologically and physically exhausted.

Summary

Further research based on patient-centred decision making and advance care planning is required to ensure the supportive needs of COVID-19 patients with cardiovascular disease are adequately met. This research should focus on interventions applicable to daily healthcare practice and include strategies to safeguard staff well-being.

Keywords

advance care planning, cardiovascular disease, COVID-19, palliative care, staff vulnerability

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in Wuhan, China, in late 2019, spreading from this initial epicentre to become a global pandemic. Named by the World Health Organisation as COVID-19, this highly contagious disease continues to challenge healthcare systems, and the social and economic fabric of many countries worldwide. This novel beta-coronavirus infection follows binding of the club-shaped spike glycoprotein on the viral surface to angiotensin-converting enzyme 2 (ACE2) receptors on host cell membranes. ACE2 is widely expressed in tissues throughout the body, particularly in respiratory alveolar cells, but also in the myocardium, gut, and kidneys. The resulting multisystem thrombo-inflammatory syndrome often generated by a cytokine storm, predominantly manifests as a severe form of interstitial pneumonia with

a high case fatality rate. This is most evident in the frail elderly population [1,2], but even younger patients with preexisting cardio-metabolic diseases such as coronary artery disease, chronic heart failure, hypertension, or diabetes are at particular risk [3^{***}]. The severe inflammatory response may destabilise atherosclerotic plaques with subsequent rupture and thrombosis, triggering acute coronary syndromes.

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KEY POINTS

- COVID-19 has highlighted the urgent need to better integrate supportive care into the management of patients with cardiovascular disease.
- Early open and honest communication between professionals, patients and family members, can enable difficult discussions and sharing of decisions, before it is too late.
- Isolation remains a dominant concern and may be partly ameliorated with the incorporation of telemedicine into daily clinical practice.
- Staff well-being should be a management priority, to ensure the safe and optimum delivery of comprehensive cardiovascular care.

The haemodynamic and neurohumoral responses to this aggressive disease also may precipitate decompensation in patients with chronic heart failure. A study of 6439 patients with heart failure admitted to the Mount Sinai Health System in New York City showed them to have an in-hospital mortality of 40.0%, irrespective of ejection fraction phenotype, compared to 24.9% in those without preexisting heart failure [4]. Although the mechanisms remain to be fully elucidated, coronavirus-mediated direct cardiac injury as evidenced by troponin T (TnT) elevation, also confers a bleak prognosis. Guo *et al.* observed an inpatient mortality of 59.6% in COVID-19 patients with high TnT levels compared to 8.9% for those in whom this biomarker was normal [5]. Notably, the highest mortality of 69.4% was seen in those with elevated TnT levels and antecedent cardiovascular disease. Many of those with COVID-19 exhibit profound hypoxia and require consideration for intensive care admission, intubation and mechanical ventilation. However, given the poor rates of survival observed in infected older persons and those with preexisting cardiovascular conditions, dilemmas arise in weighing the justification for such interventions with the need to triage towards a more compassionate approach in the provision of palliative and supportive care [6¹¹]. The COVID-19 pandemic has emphasised the urgent need for cardiovascular clinicians to consider a palliative approach within the daily management of their patients [7].

PALLIATIVE CARE AND THE COVID-19 PANDEMIC

The goals of palliative and supportive care are to reaffirm positive and life-transforming change, allowing individuals affected by serious or life-threatening

diseases to have improved health-related quality of life [8]. This multidisciplinary holistic form of support encompasses good communication and assessment of palliative care needs to enhance quality of life and optimise symptom management, with interventions to address psychosocial issues and any spiritual or existential distress. Shared decision-making should consider the appropriateness of some treatment options, including those incorporated in contemporary guideline-directed advanced heart failure therapy, which may become burdensome [8,9]. As palliative care is applicable to both patients and their families from the time of diagnosis and throughout the disease trajectory to the end of life, including bereavement support, provision should be concurrent with the co-prescription of life-prolonging therapies [10] (see Fig. 1).

The waves of those rendered severely symptomatic or dying due to COVID-19 have challenged the capacity of many palliative care providers. The international CovPall group has suggested some services were overwhelmed at times, with already constrained staffing levels further diminished by the required withdrawal of personnel with confirmed or suspected infection. A proportion of remaining staff were redistributed from inpatient palliative care settings to work in the community or acute hospitals, with a perception that palliative care was not always recognised as an integral component of the front-line response. The contribution of some palliative care professionals was reportedly further limited by the unavailability of sufficient personal protective equipment (PPE) and a reduced supply of some essential palliative medications [11].

A review by Etkind *et al.* [12] that provided an evidence synthesis of the palliative care response to COVID-19 as well as that to earlier viral epidemics and pandemics, emphasized the need for a prompt and flexible approach. They suggested that training of community-based non-specialist staff in the principles of palliative care may avoid inappropriate hospital admissions, and that the use of digital technology could support patients and families being treated in their usual place of residence, with ready access to the drugs and equipment required to deal with the commonly encountered dominant symptom cluster of breathlessness, cough, fever, delirium, anxiety and pain. These authors acknowledged that the evidence base was relatively light, and a multinational task force, predominantly involving experts in palliative care, respiratory medicine and critical care, has developed consensus-based guidance on the palliative care of people with 'serious COVID-19' being treated at home, in hospital, or in other care settings, pending the elaboration of empirical evidence [13¹²].

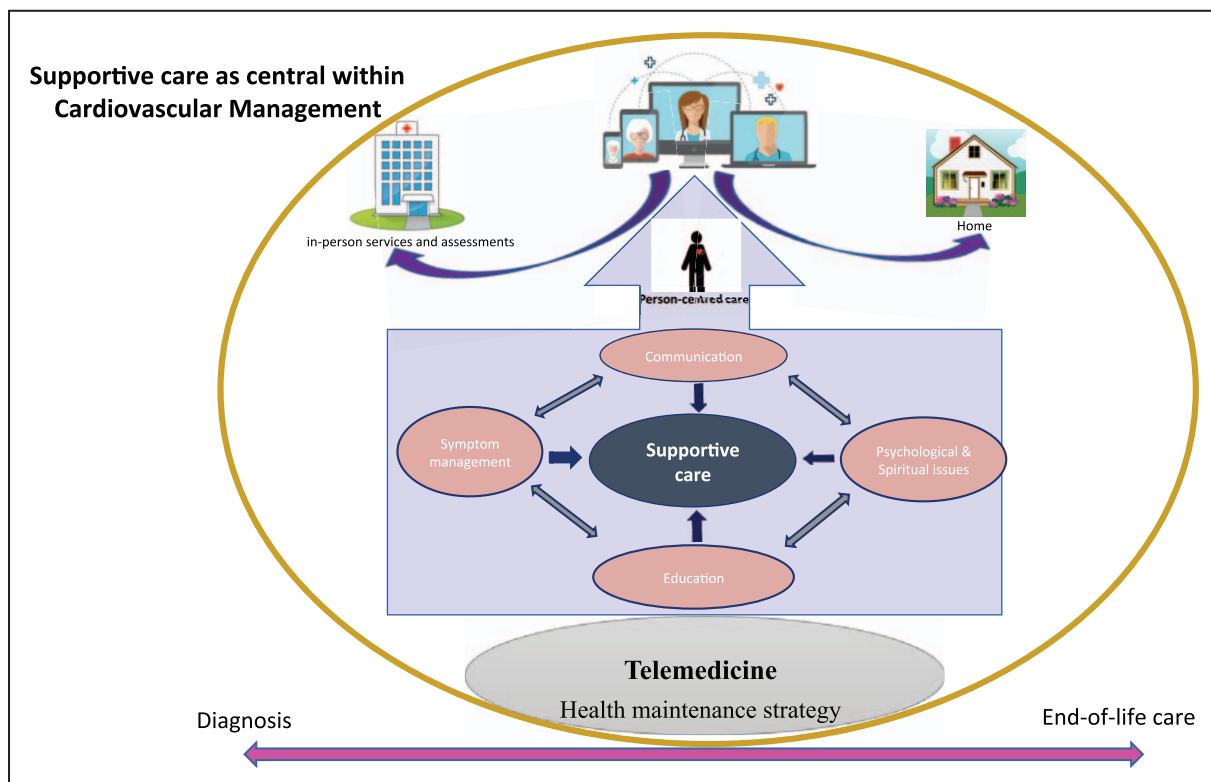


FIGURE 1. Supportive care remains central within Cardiovascular Management, irrespective of stage of illness or care setting.

COMMUNICATION, SHARED-DECISION-MAKING AND ADVANCE CARE PLANNING

The first of 14 recommendations outlined in the consensus-based guidance described above, concerned determination of the treatment preferences and goals of care of those seriously ill with COVID-19 [13²²]. In accordance with the 2011 Salzburg statement, shared-decision making is a central tenet of clinical practice [14]. However, uncertainty inherent in the extent and severity of the pathophysiologic responses to COVID-19 challenges our compliance with that ethical imperative because some of those affected may become unstable with rapid deterioration.

Given the instability and fluctuating medical status of COVID-19 patients, clinicians have been frequently required to make decisions in the moment, including those concerning the utilitarian allocation of limited resources such as intensive care beds based on the principles of distributive justice [15]. Sometimes linked to this, dilemmas also arise in the appropriateness of 'do not attempt cardiopulmonary resuscitation' (DNACPR) decision-making relating to patients for whom no post-arrest intensive care access is possible, or if they are deemed to be ineligible for these facilities in the face of progressive clinical deterioration despite optimal pharmacologic support [16]. It is important to emphasise that any DNACPR decisions should be made

transparently, and in the light of peoples' individual circumstances, rather than arbitrarily based on their age, race, or specific underlying medical conditions, even if these aspects might partly influence outcomes [17]. In the United Kingdom, concerns have been raised about possible blanket DNACPR policies being applied to some groups in the early phase of the pandemic including older people, care home residents, and individuals living with a variety of disabilities [18].

Early data on hospitalised patients from China reported median timelines from symptom onset to the development of significant breathlessness as 5 days, with the emergence of an acute respiratory distress-like syndrome by 8 days [19], suggesting the need for very early discussion. Meaningful empathetic information exchange on realistic treatment options, often undertaken in an already alien and threatening environment, is further hindered by the physical and emotional barriers imposed by the mandated use of PPE. Where possible, effective communication is fundamental to this process, but this interchange is clearly nuanced, and it is important to frame and calibrate the content of such discussions to accommodate patients' and families' receptiveness and health literacy. Dual-process theory also suggests that decision-making in older people tends to be more intuitive than analytical, and they may more readily defer to their responsible

Table 1. Prompts professionals may consider when opening discussion on supportive care (Amended from Gorodeski *et al.* [33])

1	Have you thought about your preferences for treatment should you become very unwell and need consideration for intensive care?
2	Does your family or healthcare proxy know what your care preferences are if you become unwell and could not make decisions for yourself?
3	Have you completed an advance directive form?
4	Have you completed a healthcare power of attorney form?
5	What about your implanted device? (if applicable)

clinicians. Professionals need to be aware of the risk of paternalism, and their own potential biases.

During the COVID-19 crisis most people, regardless of their health status, have reflected on their own vulnerability. Those living with established cardiovascular disease who are prone to recurrent hospitalisation and fluxes in clinical status have become particularly aware of their mortality risk and the possibility of death and dying. Given the prognostic ambiguity related to COVID-19 in those with cardiovascular conditions, it is important for healthcare providers to communicate openly and early with patients and those close to them, and to engage in discussion about life-sustaining therapies, resuscitation policies, and end-of-life care. Because some affected patients will necessarily require oropharyngeal intubation and ventilation, precluding their personal contribution to decision-making, such discussions would also afford patients the opportunity to nominate a family member or significant other to undertake decisions on their behalf, and ensure their best interests are maintained. It should be noted, however, that concordance of patient-surrogate decisions on medical treatment is relatively poor [20], and undertaking such emotionally laden decisions on behalf of another family member at a time of stress and anticipatory grief may be difficult. Disputes can also arise within families regarding who is best placed to assume this role, or there may be discord around the decisions themselves. At such times, the involvement of a clinical ethicist, where available, may be useful in achieving consensus. Patient centred value-based advance care planning would clearly mitigate against possible conflicts and facilitate appropriate care, but to date this has not been widely adopted by those with long-term cardiovascular disease. Possible prompts to incorporate in discussions are shown in Table 1.

In the United States, the National Hospice and Palliative Care Organization and a group at Harvard Medical School have developed communication

tools to promote shared decision-making and advance care planning specifically related to the COVID-19 pandemic [21,22].

AVOIDING ISOLATION AND ENSURING CULTURALLY COMPETENT CARE

With visiting prohibited, many patients have felt lonely being separated from their family members and those dear to them. Caregivers and family have been denied access to comfort their loved ones, even if they are imminently dying. Because of the risk of contagion through aerosol-mediated viral transmission in clinical areas, maintaining lines of communication between clinical staff, patients and families is best facilitated through telehealth supported systems. This allows patients and families a means through which to interact, to support each other, and to prepare for what may come, including the opportunity of saying their goodbyes if death is inevitable. A consistency of approach is important in developing and maintaining trust. Given that several professionals may be involved in providing clinical care, it might be helpful if one team member was designated as the interlocutor between individual patients and families.

Culture influences a person's worldview and affects their perception of events and the decisions around these. It shapes the way people make meaning out of illness, suffering and dying, and the way they understand and access care systems. The individual's perspective is influenced by many socio-cultural factors such as personal psychology, gender identity, life experience and spirituality, thus cultural beliefs are important considerations in approaching end-of-life care [23,24]. For those facing death, it is important to make enquiries about patients' and families' need for spiritual support and to ensure this is accessible. Furthermore, after death has occurred, within the constraints of infection control, it is important to adhere as closely as possible to the norms dictated by their faith traditions and cultures to minimise the risk of complicated bereavement.

PANDEMIC-RELATED CARDIOVASCULAR CARE TRANSFORMATION

Hospitals across the world remain under immense pressure, critical care facilities in particular struggling to cope with unceasing demand from the burgeoning influx of seriously ill patients. Acute hospital admissions include not only those with COVID-19, but also patients presenting with more severe forms of chronic illnesses. Given the perception of hospital sites as potential sources of

infectivity, there has been an understandable reluctance of the sick to seek early medical assistance, with a noticeable decline in hospitalizations due to non-COVID-19-related cardiovascular disease. A report from King's College Hospital in London compared acute heart failure admissions during March–April 2020 with those over the same 2-month period in 2019. Those hospitalized in 2020 had a higher proportion of patients with New York Heart Association class III or IV symptoms (96% vs. 77%, $p=0.03$) and more severe peripheral oedema (39% vs. 14%, $p=0.01$) [25]. Similar heart failure admission trends and features were noted in several other countries [26–28]. Many patients manifesting such severe degrees of heart failure have poorer outcomes and are subject to a symptom burden and palliative care needs compared to those with advanced cancer and other progressive long-term conditions such as severe chronic obstructive pulmonary disease [29].

Healthcare systems have had to become agile in trying to respond to the pandemic, and the European Society of Cardiology (ESC) has issued guidelines on service reconfiguration [30[■]]. To reduce SARS-CoV-2 transmission and to maintain a healthy workforce during the pandemic, health systems have transitioned, where possible, in the development and use of noncontact care delivery methods for ambulatory care [31], adopting alternative therapeutic pathways and forms of monitoring to ensure the continued provision of good healthcare and prevention strategies, and the prompt management of acute events while complying with social distancing [32,33]. Telemedicine, while still not universally recommended awaiting the development of more robust evidence [34], appears to be a useful means in preventing the negative direct and indirect consequences of SARS-CoV-2. The main benefits include coordinating the treatment of patients in the community and avoiding the risk of disease transmission inherent in hospital attendance, supporting patients with cardiovascular disease who are isolating at home, and monitoring the status of those with heart failure recently discharged from the hospital.

For patients with chronic heart failure, the main goal of telemedicine during COVID-19 has been to offer a 'health maintenance strategy', providing them with individualized self-care targets, and determining suitably aligned adjustment of therapy to address fluctuations in their condition [35,36]. However, this telehealth format is not without its downside and is reliant on easily installed user-friendly technology, utilising an intuitive interface to garner accurate information and promptly communicate with patients of all ages who may be subject to a range of cardiovascular conditions

[37]. It is also contingent on patients being relatively tech savvy, able to provide a comprehensive, accurate history, to adopt self-care behaviours and to adhere to treatment advice. The use of artificial intelligence within an e-health product has also been advocated as potentially offering a predictive and plausible solution, integrated pharmaceutical guideline-driven algorithms provided through a virtual consultation service [33]. Although many sceptics remain, the roll out of telemedicine to accommodate the enforced isolation required of the COVID-19 pandemic has revolutionised patients' and professionals' attitudes, and this form of remote clinical support will likely become a central plank of the delivery of cardiovascular clinical services in the longer term [38].

Although the restrictions of the pandemic may have acted as enablers of the adoption of virtual care, this cannot replace the fundamental benefits of long established in-person service provision and assessment, and these should continue whenever possible [32,39]. For those patients who recover, preparing for discharge is essential, ensuring comprehensive education with provision for emergency and planned follow-up. Certainly, enhancing community care is vital at a time when many of the survivors of COVID-19 are living with the long-term physical and psychological effects of the virus. Many rehabilitation services have been withdrawn during the pandemic but may be particularly relevant to those subject to so-called 'long COVID', now designated as the Post-Acute Sequelae of Sars-CoV-2.

SUPPORTING PROFESSIONALS IN CRISIS

Cardiovascular clinicians, both physicians and nurses, are central to the assessment and treatment of those with cardiovascular disease, and heart failure specialist nurses in particular, have a pivotal role in heart failure management. Many such individuals have been redeployed from their usual clinical roles and customary working environments to help cope with the pandemic-related increased clinical workload. The impact of working on the front-line during the COVID-19 pandemic has been described as '*affecting staff mentally, emotionally, psychologically and physically*' [40]. These effects are evident internationally and across a variety of care settings [41[■],42]. Initial concerns were focused on perceived lack of adequate PPE and anxiety about healthcare-acquired infection. These fears were underscored by infections occurring among clinical staff, some of whom succumbed to COVID-19 [43]. There has also been apprehension about viral transmission to others in their household, compelling some health professionals to live apart from their families.

During the pandemic, relentless and intense clinical workloads have continued, along with the need to assume clinical responsibility for a high proportion of very sick and dying patients. As a result, many healthcare providers have been subject to extreme moral distress.

A number of strategies have been proposed to counteract the understandable resultant physical and psychological exhaustion leading to burnout that affects even highly motivated healthcare workers. These include screening for adverse mental and emotional responses and the development of timely tailored preventive measures [44]. Mentoring and mutual support strategies with opportunities for debriefing should be offered routinely, geared to sustain personal resilience. The avoidance of compassion fatigue as a consequence of repeated exposure to the stressors arising in the current clinical environment is particularly important for the delivery of effective end-of-life care.

CONCLUSION

The COVID-19 pandemic has brought to the forefront many challenges to healthcare systems that have long existed in the background. One of the less obvious, but most important challenges is the appropriate provision of palliative care. The decision to refer a patient to palliative care is one that is made in concert with the patient and family, but it is more difficult to include the patient if the decision is made late in the course of an illness. Cardiac patients with advanced disease, particularly those with heart failure, are appropriate for palliative care at any stage and earlier referral is best before the patient is in crisis. With COVID-19, some patients, who could best be served with palliative care are not receiving this in a timely fashion. We suggest that palliative care referral be considered early when a patient with heart failure or advanced cardiac disease is diagnosed with COVID-19 and that telemedicine options be used to initiate these conversations. More research is needed to determine the optimal way to initiate palliative care in this population in general and on using telemedicine options.

Although the literature is limited in this area and more research is needed, there is evidence that nurses, physicians and other healthcare staff across the globe are suffering from moral distress and enduring crushing, unending workloads due to COVID-19. Preventive strategies need to be tested and put into place to provide support for these healthcare workers. Such strategies will have a place now and in the future given the inevitability of other healthcare crises, and are worth developing for the long-term benefit of all healthcare professionals.

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Conflicts of interest

There are no conflicts of interest.

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- of special interest
- of outstanding interest

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