

Outpatient management of heart valve disease following the COVID-19 pandemic: implications for present and future care

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ABSTRACT

The established processes for ensuring safe outpatient surveillance of patients with known heart valve disease (HVD), echocardiography for patients referred with new murmurs and timely delivery of surgical or transcatheter treatment for patients with severe disease have all been significantly impacted by the novel coronavirus pandemic. This has created a large backlog of work and upstaging of disease with consequent increases in risk and cost of treatment and potential for worse long-term outcomes. As countries emerge from lockdown but with COVID-19 endemic in society, precautions remain that restrict 'normal' practice. In this article, we propose a methodology for restructuring services for patients with HVD and provide recommendations pertaining to frequency of follow-up and use of echocardiography at present. It will be almost impossible to practice exactly as we did prior to the pandemic; thus, it is essential to prioritise patients with the greatest clinical need, such as those with symptomatic severe HVD. Local procedural waiting times will need to be considered, in addition to usual clinical characteristics in determining whether patients requiring intervention would be better suited having surgical or transcatheter treatment. We present guidance on the identification of stable patients with HVD that could have follow-up deferred safely and suggest certain patients that could be discharged from follow-up if waiting lists are triaged with appropriate clinical input. Finally, we propose that novel models of working enforced by the pandemic—such as increased use of virtual clinics—should be further developed and evaluated.

INTRODUCTION

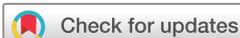
Following the outbreak of the novel SARS-CoV-2 pandemic, in order to prepare for a potential influx of patients with COVID-19 into hospitals and—in particular—intensive care units, all non-essential operations and interventional procedures in the UK and many other countries were stopped. Healthcare professionals were often redeployed to emergency patterns of working, sometimes outside of their usual scope of practice. Thus, the urgent and routine care for millions of patients with non-COVID illnesses has been interrupted. This is important for patients with heart valve diseases (HVDs), as close surveillance and timely repair or replacement of diseased valves are crucial to avoid death or irreversible damage to the myocardium

and to optimise outcomes following intervention. As the world relaxes strict lockdown measures and attempts to return to some form of 'normality', considerable transformations will be required in the configuration and delivery of outpatient services. The British Heart Valve Society is the official professional society concerned with HVD in the UK. In this article, we outline the likely challenges and propose solutions that healthcare providers could use to maintain delivery of high-quality and safe outpatient services for patients with HVD. Furthermore, some lessons have been learnt from enforced altered working patterns during recent months that have helped to challenge previously established methods of delivering care and thus afford opportunities to consider reshaping HVD services in a positive manner.

ACUTE PANDEMIC: WHAT ARE THE CHALLENGES?

At present, in many countries, few face-to-face outpatient clinics are being conducted, with most clinic appointments carried out as teleconsultations or video (virtual) consultations. In addition, there is reduced capacity for echocardiography. It is thus essential that services develop a hierarchical model that prioritises patients with the greatest clinical need (see [figure 1](#)). It is likely that certain follow-up time intervals will need to be lengthened over the coming 12–24 months; not all patients who previously would have undergone echocardiography will do so, and some patients will be discharged from further follow-up, as outlined further. In the experience of several authors of this article, clinical validation of the waiting list can result in up to a quarter of patients either being discharged or having their outpatient assessment deferred, allowing those patients with either the most urgent clinical need (eg, symptomatic severe disease) or complex disease (eg, multivalve disease) to be prioritised (for treatment or use of limited face-to-face clinic visits).

The challenges that must be dealt with in providing care for patients with HVD during this acute phase and the coming months are illustrated in [figure 2](#). These challenges encompass all aspects of the patient pathway, from diagnosis of new referrals to follow-up of patients with known HVD and delivery of timely interventions for patients in need of valve repair/replacement.



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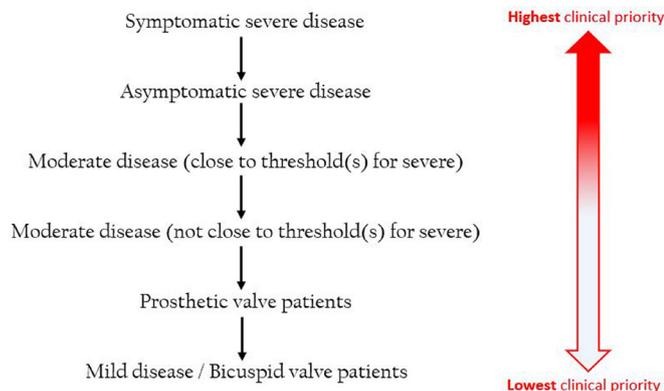


Figure 1 Hierarchy of clinical priority for treating patients with heart valve disease.

HIGHEST CLINICAL PRIORITY: SEVERE NATIVE VALVE DISEASE

Irrespective of the valve lesion, the strongest indication for valve replacement in patients with severe disease is the onset of symptoms.¹ Patients with known severe HVD should be prioritised for review with a detailed history to determine if they remain truly asymptomatic. All patients who have developed symptoms attributable to HVD should be referred on to the heart valve multidisciplinary team (MDT) for discussion. Asymptomatic patients with normal cardiac function can be safely followed up in the clinic, but those with marked cavity dilatation or fall in ejection fraction below accepted thresholds should also be prioritised for valvular intervention. The use of ‘virtual MDTs’—with the ability to review echocardiography and radiological investigations—has increased recently, and this permits ongoing multidisciplinary review of patients.

MANAGEMENT OF SEVERE AORTIC STENOSIS (AS) DURING THE COVID-19 EPIDEMIC

Once patients with severe AS develop symptoms, timely valve replacement is required to prevent complications, including death and heart failure.² Delays in valve replacement surgery are

associated with death while awaiting surgery or impaired survival after surgery.^{3,4} Thus, the COVID-19 pandemic—which has lengthened waiting lists for valve intervention in most centres—highlights the need for clinical prioritisation of patients requiring intervention. Among the patients with symptomatic severe AS, those that merit the very highest clinical priority include those with advanced (classes III–IV) heart failure, impaired ventricular function (left ventricular (LV) ejection fraction of <50%) or syncope—these highest-risk patients ideally require valve intervention within 2 weeks and certainly no more than 4 weeks. Indeed, hospital admission to facilitate urgent valve intervention may be required in such cases. Patients who have low-flow low-gradient severe AS, either with preserved or depressed LV function, often pose challenges in establishing true severity of disease and identifying symptoms; this patient cohort is more likely to require a face-to-face clinic visit with an experienced clinician and expert interpretation of the transthoracic echocardiogram (TTE).

Surgical aortic valve replacement (sAVR) and transcatheter aortic valve implantation (TAVI) are recognised modes of intervention for AS. In the current environment, the short-term and long-term benefits of sAVR versus TAVI should be considered on an individual patient basis, including requirement for general anaesthesia and intensive care unit admission, length of stay in hospital and risk of peri-procedural exposure to COVID-19 – detailed articles regarding decision-making for TAVI versus sAVR in patients with severe AS during COVID-19 have recently been published.^{5,6} It is suggested that TAVI may be a reasonable option in patients >75 years of age with severe symptomatic AS who would normally have undergone surgery if, at an individual hospital, the waiting list for TAVI is significantly shorter than that for sAVR. However, there are significant geographical variations in waiting times for sAVR and TAVI, and thus it is vital that MDT discussions focus on the most timely intervention available *locally*—in some centres this may favour sAVR and in others may favour TAVI. In exceptional circumstances, it may be necessary to consider balloon aortic valvuloplasty as a ‘bridge’ to sAVR or TAVI if definitive treatment cannot be delivered urgently. An algorithm for the management of patients with moderate and severe AS in the current climate is provided in figure 3 and proposals for managing all aortic valve disease patients are listed in table 1.

MANAGEMENT OF SEVERE MITRAL REGURGITATION (MR) DURING THE COVID-19 EPIDEMIC

Patients often tolerate severe MR without developing symptoms and, if LV dimensions and ejection fraction remain below thresholds for intervention, surgery may not be needed for years.⁷ Thus, patients with known asymptomatic severe MR who were not close to thresholds for surgery at their last clinical visit could have a telephone follow-up appointment and, assuming they remain well, could be reassessed at their next follow-up visit. We suggest that the time interval between visits can be increased from the usual 6 to 9 months in the current COVID-19 pandemic (see table 2). Patients with known asymptomatic severe MR who were already close to thresholds for surgery will require echocardiography, in addition to clinical review. Patients with symptomatic severe MR should be considered for urgent surgical repair, which remains the preferred option; in exceptional circumstances, transcatheter mitral valve therapies may be considered in patients with decompensated MR when timely access to surgical valve repair/replacement is not possible.

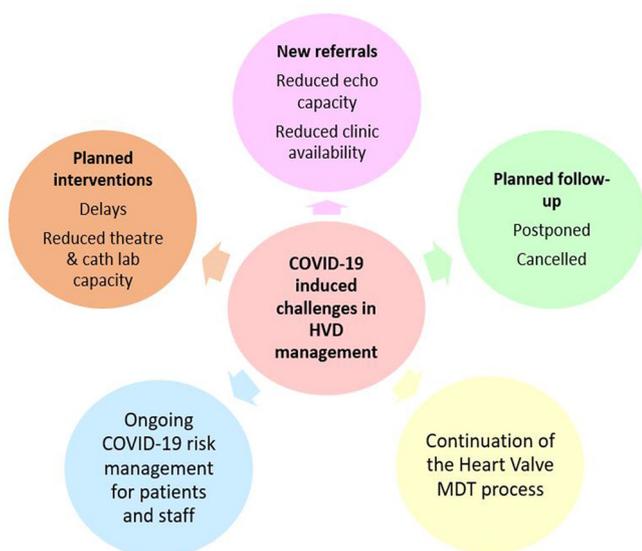


Figure 2 Challenges with care of patients with HVD posed by the COVID-19 pandemic. HVD, heart valve disease; MDT, multidisciplinary team.

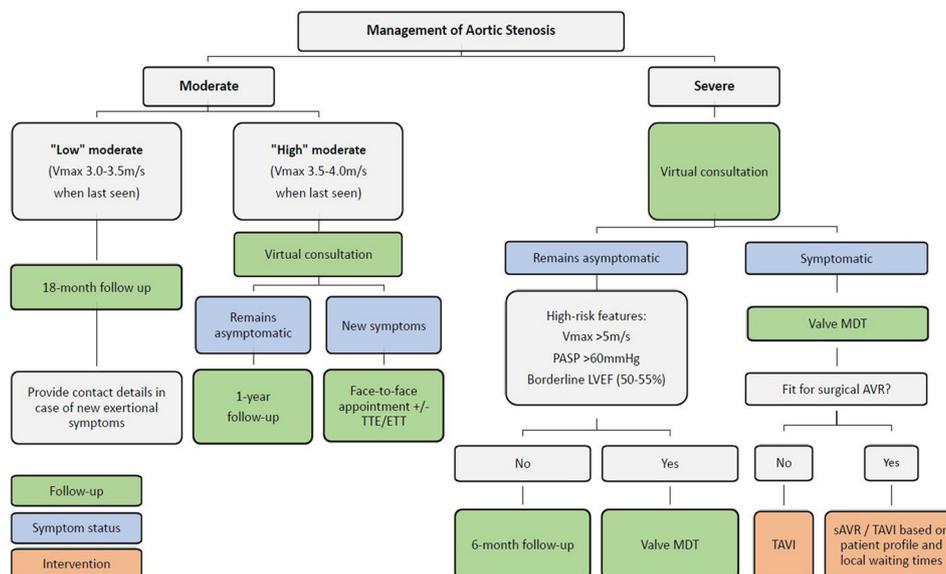


Figure 3 Flow diagram for proposed management of moderate and severe aortic stenosis following the COVID-19 pandemic. Certain patients with asymptomatic severe AS but certain 'high risk' features should also be considered for intervention in the Valve MDT meeting, but it is essential that symptomatic patients are treated before asymptomatic patients. AVR, aortic valve replacement; ETT, exercise treadmill test; LVEF, left ventricular ejection fraction; MDT, multidisciplinary team; PASP, pulmonary artery systolic pressure; sAVR, surgical aortic valve replacement; TAVI, transcatheter aortic valve implantation; TTE, transthoracic echocardiogram.

PRIORITISATION OF PATIENTS IN NEED OF HEART VALVE PROCEDURES

Efficient yet pragmatic strategies for restoring cardiac services will be required at national, regional and local levels. Inter-hospital transfers of patients to deliver valve interventions will need to continue. Cardiac operations and interventions should be prioritised according to clinical need and the risk of delayed treatment and not administrative considerations like time on the waiting list. Given the clinical urgency with which symptomatic patients with HVD require treatment, therefore, this may well require an increase in activity and sessions for heart valve procedures. This may lead to reduced capacity for procedures in which there is less clinical urgency. At a practical level, this means discussing and planning the aforementioned strategies locally as part of cardiac service restoration processes within cardiac catheter laboratories and cardiac theatres and planning with anaesthetists for procedures that require general anaesthesia.

WORK-UP FOR CARDIAC SURGERY

Patients undergoing heart valve surgery require preoperative assessment of coronary anatomy and, normally, this is done via diagnostic coronary angiography. CT coronary angiography (CTCA) is an alternative especially in younger patients. Cardiac centres should assess their local waiting times for invasive and CT angiography, as currently in some centres, the wait for CTCA may be shorter than for coronary angiography (and vice versa). This is often not necessary in older patients undergoing TAVI, especially if there is no history of angina, in whom invasive angiography is often not required. Prompt referrals to cardiac surgeons for clinic review will still be required for symptomatic patients. As lockdown measures are eased, face-to-face clinic availability will increase, allowing for full assessment of fitness for surgery and discussions of risks and benefits of proposed interventions.

INTERMEDIATE CLINICAL PRIORITY: MODERATE NATIVE VALVE DISEASE

Moderate HVD encompasses a broad spectrum of patients, ranging from only just more than mild disease to those approaching severe HVD. This needs to be appreciated in the triaging of patients, since patients with moderate-severe aortic stenosis, for example, have an increased risk of events,⁸ and so such patients need to be considered as higher risk. Thus, patients with known moderate HVD who were near the cut-offs for severe disease at the last follow-up should be prioritised over patients with stable moderate HVD not near cut-offs for severe HVD.

Many patients with stable moderate HVD who were due for surveillance review during the lockdown period will have remained asymptomatic and, for these patients, a further in-person review is unnecessary. Some hospitals continued with telephone consultations through the lockdown, and patients who remain well with the same exercise tolerance as when last seen and with no new symptoms do not require a hospital visit or a repeat echocardiogram, as decisions for intervention are predominantly symptom-driven. Patients with known moderate disease are unlikely to have progressed to critical disease within a 12-month time interval. Patients who appear to have new symptoms should have a hospital visit for in-person assessment (ie, physical examination, repeat echocardiography and even exercise stress testing if the aetiology of symptoms remains unclear). The clinic assessment and any tests required should all be performed on the same day to minimise trips to the hospital.

LOW CLINICAL PRIORITY: PROSTHETIC VALVES AND MILD DISEASE

Individuals who require intermittent but long-term surveillance following valve repair or replacement represents the patient cohort most suitable to a virtual follow-up clinic model. Such patients are often well for many years and do not require annual echocardiography.⁹ In the current environment, to reduce

Table 1 Managing aortic valve disease in the context of COVID-19

Recommendations	
Aortic Stenosis	
Mild	Consider discharge in patients aged >75 years; follow-up scan in 3 years for patients with bicuspid valve or patients aged <75 years who are realistic candidates for future valve intervention
Moderate	V _{max} 3.0–3.5 m/s→virtual consultation in 18 months V _{max} 3.5–4.0 m/s→virtual consultation now: ▶ If patient remains asymptomatic→follow-up in 1 year. ▶ If patient has new symptoms→face-to-face assessment for examination/echocardiogram/treadmill test.
Severe	Patients eligible for sAVR or TAVI ▶ Symptomatic→refer for MDT discussion and work-up for valve replacement. ▶ Asymptomatic→look for presence or absence of 'high risk' markers, defined as – AV V _{max} >5 m/s (ie, peak transvalvular gradient>100 mm Hg). – Estimated PA systolic pressure>60 mm Hg. – Borderline LVEF (50%–55%). ▶ Patients with ≥1 high-risk feature should be discussed at the valve MDT, as despite lack of symptoms, there are likely to be delays in diagnostic and surgical pathways over the next 12–18 months. ▶ If there are any doubts about symptoms, consider exercise test, especially in sedentary patients. Patients who are only considered for TAVI ▶ Omit echocardiogram and do 6 monthly phone clinics alone as main indication for intervention is symptoms. ▶ Backup contact phone number to contact if there is symptomatic deterioration.
Aortic regurgitation	
Mild	Discharge
Moderate	Annual virtual follow-up with 2 yearly echocardiography
Severe	6 monthly virtual follow-ups with annual echocardiography

Recommendations for the management of patients with aortic stenosis and aortic regurgitation following the COVID-19 pandemic.

AS, aortic stenosis; LVEF, left ventricular ejection fraction; MDT, multidisciplinary team; PA, pulmonary artery; sAVR, surgical aortic valve replacement; TAVI, transcatheter aortic valve implantation.

hospital visits, patients undergoing heart valve surgery should have echocardiography just prior to hospital discharge to act as the baseline scan for future comparison. Assuming this scan reveals normal prosthetic valve and ventricular function, further clinical follow-ups for most patients should be undertaken as virtual clinics (see [table 3](#)). Routine echocardiography for certain patients (eg, patients with bioprosthetic valves) should be omitted at present if the patient remains well with no new symptoms since last assessment. Echocardiography could also be omitted if patients who are seen in person have no auscultatory signs of new or progressive disease. It may also be pragmatic to discharge selected patients (with appropriate advice) from follow-up if not realistic candidates for repeat intervention in the case of complications. A sample set of questions for a virtual clinic assessment is provided in [box 1](#).

If patients with mild disease are being followed up, they should mostly be discharged except in specific circumstances, for example, if there is a bicuspid aortic valve with leaflet thickening, in which case a repeat assessment at 3 years is recommended. In the absence of leaflet thickening, a repeat assessment is reasonable in 5 years. Patients with mild calcific aortic stenosis should only be offered repeat echocardiography after 3 years if they are realistic candidates for valve intervention at a later stage; this

will often be the case for younger patients (<75 years) but may not be true for more elderly or frail patients.

ECHOCARDIOGRAPHY

The decision whether to perform surveillance echocardiograms in patients with HVD must be balanced against, first, the demand for echocardiography from other services (eg, oncology patients having echocardiograms to ensure safe continuation of chemotherapeutic drugs) and, second, the risk to patients of contracting COVID-19, given that the virus is now endemic and data suggest many healthcare workers are asymptomatic carriers.¹⁰ The patient may wish to exercise judgement on whether to attend for the scan or not. In order to mitigate against this risk, we recommend that, where possible, hospitals use 'cold sites' for outpatient scans; this could involve using one hospital site for outpatient scans and a different site for emergency work or may involve a hospital purchasing capacity at a local private hospital. In order to ensure that cold sites remain free from infection, some centres are already testing staff routinely with regular COVID-19 swabs.

Many echocardiograms in HVD are done for reassurance, especially in patients with prosthetic valves. If the patient is well, the echocardiogram is unlikely to change management, and this principle acquires greater importance during the current pandemic. As outlined earlier, patients with the highest clinical priority (ie, severe native HVD) should be prioritised over patients with moderate or mild disease when availability of echocardiography is limited. Transoesophageal echocardiography (TOE) is an aerosol-generating procedure that currently requires use of full personal protective equipment (PPE); we recommend that TOE is used sparingly in the current setting. Careful and/or expert review of transthoracic studies can often obviate the need for TOE. Furthermore, use of cross-sectional imaging techniques in place of TOE (eg, cardiac MRI for quantification of severity of aortic regurgitation or MR) could be considered in the current climate.

Table 2 Managing mitral valve disease in the context of COVID-19

Recommendations	
Mitral stenosis	
Mild	Discharge
Moderate	Annual virtual follow-up with 2 yearly echocardiography
Severe	Symptomatic→refer for MDT discussion and work-up for valve replacement/balloon mitral valvuloplasty Asymptomatic→annual follow-up with echocardiography
Mitral Regurgitation	
Mild	Discharge
Moderate	Primary MR→annual virtual follow-up with 2 yearly echocardiography Secondary MR→consider discharge (especially if stable for the past 2 years) with contact details in case of deterioration
Severe	Symptomatic→refer for MDT discussion and work-up for valve replacement Asymptomatic Candidate for surgery: extend time interval from 6 to 9 monthly follow-ups with echocardiography Candidate for transcatheter therapies only: virtual clinic follow-up at 9 monthly intervals Not a candidate for any intervention: discharge with appropriate advice to patient and general practitioner regarding management of symptoms

Recommendations for the management of patients with mitral stenosis and mitral regurgitation following the COVID-19 global pandemic.

MDT, multidisciplinary team; MR, mitral regurgitation.

Table 3 Follow-up recommendations after valve interventions in the context of COVID-19

Surgical interventions	Valve implanted prior to COVID-19	Valve implanted during COVID-19
Mechanical valves and bioprosthetic valves and MV repair	Annual clinical assessment via a virtual clinic TTE not routinely indicated; only perform if known abnormality on previous study under surveillance (eg, paravalvular leak, progressive rise in gradients, known transvalvular MR in a previously repaired MV) or new symptoms/signs suggestive of valve dysfunction on clinical assessment	Baseline echocardiogram just before hospital discharge Either in-person or virtual (video) consultation for surgical check-up at 6 weeks* Virtual clinic assessment at 1 year; no need for TTE if patient remains well and is asymptomatic Annual virtual clinic assessment thereafter until return to normal clinic capacity—either with hospital specialist or community cardiology team (eg, GPSI in the UK)
Transcatheter interventions		
TAVI and MitraClip	Annual clinical assessment via a virtual clinic No need for TTE if no new symptoms and no cause for concern on last echocardiogram	Baseline echocardiogram just before hospital discharge Either in-person or virtual (video) consultation for check-up at 3 months* Virtual clinic assessment at 1 year; no need for TTE if patient remains asymptomatic and baseline TTE gave no cause for concern Annual virtual clinic assessment with hospital specialist thereafter until return to normal clinic capacity

Suggested follow-up schedules for patients following surgical and transcatheter heart valve interventions, performed either prior to the COVID-19 pandemic or during this period.

*Denotes timepoints when, ideally, an ECG would be recorded at follow-up; if patients are not coming to the hospital for follow-up, this may be possible via their family doctor/general practitioner. GPSI, general practitioner with specialist interest; MR, mitral regurgitation; MV, mitral valve; TTE, transthoracic echocardiogram.

An important consideration for patients who do have echocardiograms is whether to perform focused scans or a 'full' study. Several factors need to be considered. The size of a waiting room in an echocardiography department will have some impact on the number of scans that can be delivered in a day, as social distancing between patients in waiting areas will need to be maintained for the foreseeable future. Patients with known HVD could likely undergo focused scans; the consultant in charge of the clinic should decide which views and measurements are essential. Patients with known moderate or severe valve disease may just need a focused study looking for LV cavity dilatation or systolic dysfunction. We suggest that new patients should still undergo a full TTE study to avoid missing pathology on their baseline scan. If there is a recent TTE from a private provider or other hospital, then we recommend that the team managing the patient seek to transfer this to avoid repeating the study.

NEW PATIENTS WITH HVD

Waiting times for outpatient reviews are likely to be prolonged, so there must be triage of referrals to ascertain clinical priority. Triage of patients on waiting lists should not be left to administrative staff to perform on a chronological basis—a clinician's input will be required to identify those patients whose clinical picture warrants greater urgency and thus prioritisation. Undiagnosed murmurs are a frequent cause of referral to hospital for echocardiography, and

many do not have HVD.¹¹ Accordingly, at present, we suggest that patients with suspected murmurs are not referred for echocardiography, and asymptomatic patients with definite murmurs should either have their referral deferred by 6 months or, if local services allow, be assessed by a community cardiology service (often led in the UK by general practitioners with a specialist interest in cardiology). Certain patients may require immediate assessment, such as those with symptoms suggestive of infective endocarditis or with severe decompensation of native valve disease (eg, aortic stenosis with reduced exercise tolerance or overt breathlessness or chest tightness). Urgent cases should be seen within 2–4 weeks if there are symptoms of valve disease, and these would need to be in-person visits to determine suitability for intervention.

MANAGEMENT OF INFECTION RISK

This remains of paramount importance as COVID-19 is endemic within the population, and thus the risk of infection persists. The principles to manage infection risk are listed in [box 2](#). Staff should be encouraged to maintain hand hygiene, as well as maintaining social distancing between each other whenever possible. Guidance on PPE continues to evolve. Staff should wear PPE in line with guidance from their local hospital, national public health and echocardiographic bodies¹² and/or the WHO. Departments should consider any additional requirements needed to support and reassure vulnerable members of staff.

POST-COVID: LONG-TERM IMPLICATIONS FOR HVD CARE

The unprecedented effects of the lockdown have forced hospitals to work in different ways over the past 4 months. We must consider if there are better ways of working inspired by our practice during

Box 1 Template for a telephone consultation for a postoperative follow-up clinic

Symptoms

- ▶ Chest pain?
- ▶ Exertional breathlessness?
- ▶ Reduced exercise tolerance?
- ▶ Palpitations?
- ▶ Ankle swelling?
- ▶ Dizziness/syncope?
- ▶ Fever?

Medications

General questions

- ▶ Reminder regarding good personal oral hygiene.
- ▶ Reminder regarding regular dental check-ups.
- ▶ Reminder regarding antibiotic prophylaxis.
- ▶ Check INR record for patients on warfarin.

Box 2 Principles of managing infection risk during the COVID-19 epidemic

- ▶ Consider testing patients ahead of visit.
- ▶ Personal protective equipment for staff.
- ▶ Social distancing in the waiting area.
- ▶ Augmented hand hygiene.
- ▶ Augmented machine cleaning.
- ▶ Staggered appointment times.
- ▶ Offer echo service in 'cold hospital'.
- ▶ Focused echocardiograms when appropriate.
- ▶ Separation of inpatients and outpatients either by time or location.

the pandemic. As an example, we should consider routine virtual clinics for stable patients with HVD who are not close to the thresholds for surgery and for patients following valve surgery who are well and have normal valve function on their baseline echocardiogram. The safety of changes to conventional practice, such as virtual clinics and lengthier follow-up time intervals, should be validated by appropriate surveys before such changes are adopted widely; if proven safe and effective, then clinical practice guidelines should be amended to reflect these changes to practice.

From a patient perspective—with regard to virtual consultations—the ability and facility of some patients to use mobile phones or computers for video consultations may be limited, and telephone consultations are challenging for those with hearing difficulties (who often rely on lip reading). This may disadvantage some of the most high-risk patients but is not insurmountable, as community support groups and charities (eg, Age Concern) could be engaged to help.

We should also use this opportunity to reassess the multiple investigations patients with HVD may be subjected to; for example, TOE rarely contributes beyond TTE for many types of HVD. Stress echocardiography often does not contribute beyond the simple exercise treadmill test performed to reveal occult symptoms and assess blood pressure response to exercise. Furthermore, if the ‘baseline’ postoperative TTE was normal, routine surveillance TTE after prosthetic valve implantation should be deferred when availability of echocardiography remains restricted.

CONCLUSION

Countries are emerging from strict lockdowns due to the acute COVID-19 pandemic, but healthcare continues amid endemic infection. New methods of working are required to ensure that healthcare workers and patients remain safe while timely and appropriate delivery of healthcare is maintained. It will be essential to prioritise those patients at highest clinical risk over more stable patients. For patients with known or suspected HVD, there are new opportunities to re-examine current guidelines and

outpatient practices. An opportunity exists to reduce the quantity of in-person hospital visits by expanding use of virtual follow-up clinics for selected patients and reducing numbers of echocardiograms. Finally, patients with valve disease and symptoms should be encouraged to present to medical services, and there should be easy routes of communication with no barriers between community, district hospital and cardiac centre.

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Key take home messages

- ▶ Prioritise patients with highest clinical need over more stable patients.
- ▶ Conduct virtual clinics (teleconsultations or video consultations) where possible to reduce risk of COVID-19 transmission.
- ▶ Reduce use of echocardiography and perform focused studies in selected patients.
- ▶ Lengthen follow-up intervals for patients with stable moderate disease and postoperative patients.
- ▶ Discharge most patients with mild disease.
- ▶ Consider local waiting times for surgery and transcatheter therapies in patients with severe heart valve disease in need of valve intervention.
- ▶ Liaise with colleagues and managers to ensure sufficient theatre and catheter lab sessions available to treat patients with the most urgent needs for intervention (ie, symptomatic patients with severe HVD).