COVID-19

Recovering from COVID-19: lessons learnt from an intensive secondary care follow-up service

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ABSTRACT

In response to the first COVID-19 surge in 2020, secondary care outpatient services were rapidly reconfigured to provide specialist review for disease sequelae. At our institution, comprising hospitals across three sites in London, we initially implemented a COVID-19 follow-up pathway that was in line with expert opinion at the time but more intensive than initial clinical guidelines suggested. We retrospectively evaluated the resource requirements for this service, which supported 526 patients from April 2020 to October 2020. At the 6-week review, 193/403 (47.9%) patients reported persistent breathlessness, 46/336 (13.7%) desaturated on exercise testing, 167/403 (41.4%) were discharged from COVID-19-related secondary care services and 190/403 (47.1%) needed 12-week follow-up. At the 12-week review, 113/309 (36.6%) patients reported persistent breathlessness, 30/266 (11.3%) desaturated on exercise testing and 150/309 (48.5%) were discharged from COVID-19-related secondary care services. Referrals were generated to multiple medical specialties, particularly respiratory subspecialties. Our analysis allowed us to justify rationalising and streamlining provisions for subsequent COVID-19 waves while reassured that opportunities for early intervention were not being missed.

KEYWORDS: COVID-19, secondary care, follow-up, resource utilisation, service delivery

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Background

The long-term effects of COVID-19 were unknown at the start of the first wave of the pandemic in 2020. Patients diagnosed with COVID-19 have subsequently been recognised to experience various clinical sequelae, including a range of respiratory, cardiac and neurological abnormalities, which may be associated with significant rehabilitation requirements.[1] Rapid reconfiguration of outpatient services was required in the wake of the initial surge in COVID-19 cases in the UK in the spring of 2020.[2] There is now recognition that clinical recovery may be prolonged in certain patient cohorts.[3–5] While clinical guidelines provide some guidance on minimum follow-up standards, these are based primarily on expert opinion and 'gold standard' follow-up care is not yet fully defined.[6]

At our institution, comprising hospitals across three sites in London, a comprehensive follow-up service was set up for patients diagnosed with COVID-19, starting in April 2020. In line with expert opinion but acknowledging the paucity of long-term data and considerable uncertainties at the time, our clinic included assessments and investigations supplementary to those suggested in initial guidelines, resulting in an intensive follow-up pathway. Herein, we describe the resource requirements and outcomes of our initial COVID-19 follow-up strategy. We reflect on how our experiences from the first wave clinic enabled us to justify

the streamlining of COVID-19 outpatient pathways for patients being followed up in subsequent COVID-19 surges, recognising that clinical needs are likely to evolve as more data are gathered.

Service design and implementation

All patients who attended our trust and who were either found to have a positive SARS-CoV-2 PCR result or a clinico-radiological diagnosis consistent with COVID-19 were offered a follow-up clinic appointment. The patient cohort included some individuals who had a positive SARS-CoV-2 PCR result without a history of COVID-19 pneumonitis. We also accepted direct general practitioner (GP) referrals, some of which were received via regional respiratory hotlines such as those that were set up to support primary care.[7] Exclusion criteria included patients who were either frail, severely limited in mobility or receiving comprehensive follow-up under other services, and residents of nursing homes or care homes, based on pragmatic reasons relating to mobility, accessibility and risks from potential exposure to COVID-19 in a healthcare setting. For these latter patients, GPs were asked to provide initial assessments in line with published guidelines at the time and to contact our team if concerned.

Patients were offered a face-to-face appointment at 6 weeks from the time of discharge from hospital or, in the case of patients who did not require a hospital admission, at 6 weeks from the time that they had recovered from their acute illness. Patients underwent a chest X-ray, blood tests and exercise tests (either 1-minute sit-to-stand (STS) tests or 6-minute walk tests (6MWT) performed in accordance with clinical guidelines and local standard operating procedures).[8,9] Desaturation on exercise testing was defined as a post-exertional drop in oxygen saturation of ≥4% on oximetry compared with resting or baseline saturation. Patients were subsequently deemed either fit for discharge from secondary care follow-up or in need of further outpatient review. As per a local agreement, a referral pathway was set up whereby all patients with an abnormal troponin level (troponin ≥17 ng/L for women or ≥34 ng/L for men) at any time since being diagnosed with COVID-19 were referred to cardiology clinic for further evaluation.[10]

Patients requiring additional COVID-19 clinic follow-up were reviewed again at 12 weeks. Those who required level 2 or 3 care during their initial COVID-19 admission were offered face-to-face appointments. Those requiring level 1 care or below were reviewed by telephone.

- Level 0 care is for patients whose clinical needs can be met through normal ward care.
- Level 1 care is for patients who are at risk of clinical deterioration but whose clinical needs can be met on an acute ward with additional support from critical care teams if required.
- Level 2 care is for patients requiring closer observation or intervention, including for single failing organ systems; it is typically provided in a high-dependency care setting such as a medical high-dependency unit or a critical care unit.
- Level 3 care is for patients requiring advanced respiratory support alone or monitoring and support for two or more failing organ systems; it is typically provided in a critical care unit.[11]

Patients were offered a chest X-ray, exercise test (STS or 6MWT), blood tests, echocardiography (unless recently performed), spirometry (all patients), plethysmography (level 2 or 3 patients only) and diffusion coefficient testing (level 2 or 3 patients only).

Selected patients were referred for ventilation perfusion (VQ) single-photon emission computed tomography (CT) with CT fusion (SPECT-CT) to assess for chronic thromboembolic disease. The latter imaging modality, when considered in conjunction with other investigations, can provide useful evidence to distinguish between different causes of post-COVID-19 breathlessness.[12] Patient flow through our initial COVID-19 clinic pathway is summarised in Fig 1. Formal criteria for discharging patients from the COVID-19 clinic were not defined. Patients were discharged if there were no longer any significant concerns from the reviewing clinician regarding their symptomatology or investigation results. In cases where there were persisting symptoms or abnormal test results that were felt to warrant further review, patients were referred to the appropriate respiratory subspecialty or other medical clinics but could otherwise usually be discharged from the general COVID-19 follow-up service.

We performed a retrospective review of patients who attended our clinic during the first wave. Primary data collection was undertaken to ascertain utilisation of diagnostic services and outcomes of referral pathways. The project was prospectively registered and approved as an audit for service evaluation by our institution. Formal ethics approval was not required.

Resource utilisation and outcomes

Patient characteristics

Five-hundred and twenty-six unique patients were reviewed across the 6-week and 12-week clinics. The median age of patients was 59 years (interquartile range (IQR) 50–70). The median length of hospital admission was 6 days (IQR 3–14). Patients' sex, ethnicity, comorbidities and maximal respiratory support required during their hospital attendance are summarised in Table 1.

6-week clinic

A total of 403 patients were reviewed in the 6-week clinic. Three-hundred and seventy-three (92.6%) appointments were face-to-face. The median time from discharge to first clinic review was 46 days (IQR 35–58). One-hundred and ninety-three (47.9%) patients reported persisting breathlessness. Among this breathless cohort, 91/193 (47.2%) had an abnormal 6-week chest X-ray, 15/193 (7.8%) had interstitial lung disease (ILD) and 1/193 (0.5%) had pulmonary vascular disease (PVD) on their follow-up CT of the chest, and 30/193 (15.5%) desaturated on exercise testing. Breathlessness was reported in 91/149 (61.1%) patients who had abnormal chest X-rays, in 15/20 (75.0%) patients who had follow-up CT showing ILD and in one patient who had evidence of PVD on their follow-up CT, and in 30/46 (65.2%) patients who desaturated on exercise testing.

The investigation results and referral outcomes are summarised in Table 2. The three referrals to pulmonary embolism (PE) clinic comprised one patient who was found to have an acute PE at the time of outpatient review and two patients who were found to have thromboembolic disease during their initial hospital presentation but had not yet been referred for PE follow-up.

12-week clinic

A total of 309 patients were reviewed in the 12-week clinic. One-hundred and seventy-three (56.0%) appointments were face-to-

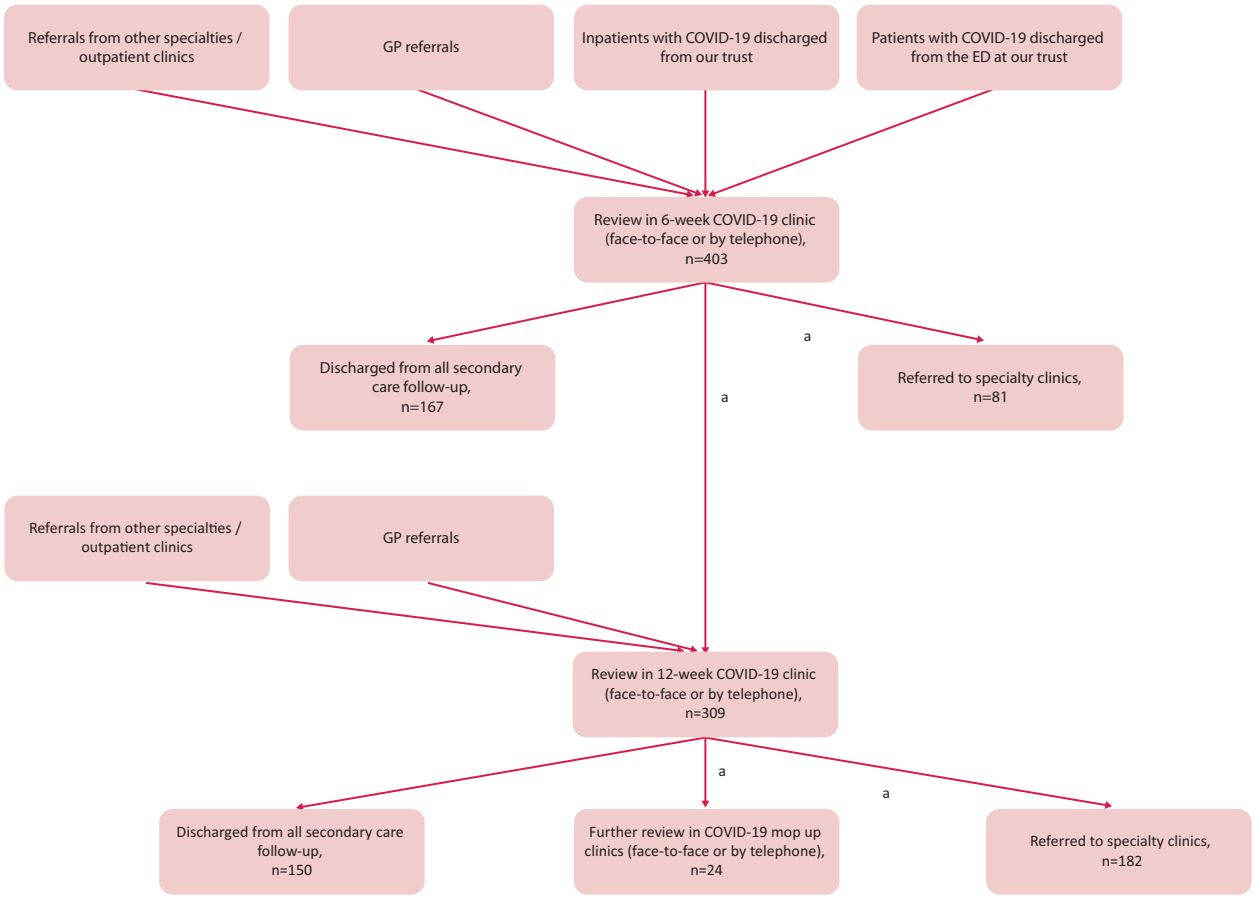

Fig 1. Patient flow through original COVID-19 clinic pathway. [a]Some patients were referred for both further review in COVID-19 clinic and for review in other specialty clinics. ED = emergency department; GP = general practitioner.

face. Clinical review occurred at a median of 97 days (IQR 88–108) following discharge. One-hundred and thirteen (36.6%) patients reported persisting breathlessness. Among this breathless cohort, 28/113 (24.8%) had an abnormal 12-week chest X-ray, 17/113 (15.0%) had ILD and no patients had PVD on their follow-up CT of the chest, 1/113 (0.9%) had thromboembolic disease only and 13/113 (11.5%) had parenchymal disease only on their VQ SPECT-CT, 12/113 (10.6%) desaturated on exercise testing, 4/113 (3.5%) had obstructive spirometry, 26/113 (23.0%) had restrictive spirometry, 14/113 (12.4%) had abnormal plethysmography, and 20/113 (17.7%) had abnormal diffusion coefficients. Breathlessness was reported in 28/57 (49.1%) patients who had abnormal chest X-rays, in 17/30 (56.7%) patients who had follow-up CT of the chest showing ILD and no patients whose follow-up CT showed PVD, in 1/2 (50.0%) patients with thromboembolic disease only and in 13/22 (59.1%) of patients with parenchymal disease only on VQ SPECT-CT, in 12/30 (40.0%) patients who desaturated on exercise testing, in 4/8 (50.0%) patients with obstructive spirometry, in 26/53 (49.1%) patients with restrictive spirometry, in 14/25 (56.0%) patients with abnormal plethysmography, and in 20/40 (50.0%) patients with abnormal diffusion coefficients.

Additionally, echocardiography in 15/245 (6.1%) patients demonstrated an abnormality, which was typically a left ventricular ejection fraction <55%. The investigation results and referral outcomes are summarised in Table 2. The referrals to PE clinic comprised patients who may have had evidence of thromboembolic disease in their admission scans but who had not yet been seen in a specialist PE clinic for follow-up, as well as those deemed to require follow-up after a VQ SPECT-CT.

Discussion

We initially developed a comprehensive approach for following up patients with COVID-19 at a time when there was limited evidence regarding the short- and long-term complications of the disease. Our evaluation has shown that our approach was resource intensive. This builds on existing service evaluation literature for COVID-19 follow-up that has been published in the UK.[13]

Reviewing patients at 6 weeks post-discharge enabled early detection of patients who were on a deteriorating trajectory, so that timely intervention could be instituted. We found that 47.9% of patients reported breathlessness and that 39.6% of chest X-rays were abnormal, comparable with the 53% of patients reporting persisting breathlessness and 38% of patients with abnormal chest X-rays identified at a median of 54 days following discharge in another London COVID-19 follow-up clinic.[14] Upon exercise testing, 13.7% of patients in our 6-week clinic desaturated. This was a lower proportion than seen in another study in which 32% of COVID-19 patients desaturated

Table 1. Patients' demographics, comorbidities and maximal respiratory support required during hospital attendance (n=526)

	Patients, n (%)
Sex	
Women	221 (42.0)
Men	305 (58.0)
Ethnicity	
Asian or Asian British	54 (10.3)
Black, Black British, Caribbean or African	85 (16.2)
Mixed or multiple ethnic groups	11 (2.1)
White	167 (31.7)
Any other ethnic group	116 (22.1)
Not specified	93 (17.7)
Pre-existing comorbidities	
Hypertension	225 (42.8)
Diabetes mellitus	152 (28.9)
Asthma	77 (14.6)
Ischaemic heart disease	43 (8.2)
Obesity	41 (7.8)
Chronic kidney disease	25 (4.8)
Chronic obstructive pulmonary disease	23 (4.4)
Heart failure	6 (1.1)
Interstitial lung disease	3 (0.6)
Maximal respiratory support required during hospital attendance or inpatient stay	
None	148 (28.1)
Supplementary oxygen with peak FiO_2 <60%	238 (45.2)
Supplementary oxygen with peak FiO_2 ≥60% but not requiring CPAP, HFNO/ Optiflow, NIV or mechanical ventilation	65 (12.4)
CPAP	6 (1.1)
HFNO/Optiflow	3 (0.6)
NIV	2 (0.4)
Mechanical ventilation	64 (12.2)

CPAP = continuous positive airway pressure; FiO_2 = fraction of inspired oxygen; HFNO = high-flow nasal oxygen; NIV = non-invasive ventilation.

upon undertaking STS tests at 1 month following discharge.[15] The difference may be explained by differing COVID-19 disease severities and comorbidities among the patient cohorts and the later time point at which our data were collected. Of the 403 patients seen at this time at our centre, 28 required CT of the chest. Only one scan demonstrated an acute PE that required intervention. This necessitated anticoagulation and was in a patient with extensive symptomatology and a past medical history that included ischaemic heart disease, hypertension and chronic renal failure. The subsequent VQ SPECT-CT performed 2 months later while the patient was still on anticoagulation showed resolution of the thromboembolic disease, although there were persisting post-inflammatory changes. We also found that 20/403 (5.0%) patients reviewed had ILD changes on CT at this time. This figure is comparable with the 4.8% of patients found to have ILD with significant functional deficits at 4 weeks following discharge in another London centre, although the time point evaluated differs slightly from ours.[16]

At 12 weeks post-discharge, spirometry was normal in 73% of patients, echocardiography was normal in 94% of patients and VQ SPECT-CT was normal in 53% of level 2 or 3 patients. Of the two patients whose VQ SPECT-CT demonstrated thromboembolic disease only, one of the PVD diagnoses was new at the time of the scan and had not been detected on prior imaging, while the other PVD diagnosis had previously been seen on the admission CT. The four patients whose VQ SPECT-CT demonstrated both thromboembolic disease and parenchymal abnormalities previously had evidence of PVD on their admission CT. A recent systematic review and meta-analysis found that the reported incidence of PE among COVID-19 patients following hospital discharge ranges between 0.2%–5.6%.[17] Another study has demonstrated a risk ratio of 33.05 for a first PE in the month following COVID-19 diagnosis.[18]

Most patients that reported persistent breathlessness did not have abnormal investigation results. Routinely requesting these investigations did not significantly alter clinical decision-making. At the time that our clinic was set up, little was known about the trajectory of COVID-19 recovery. While our service was reassuring to patients, subsequent evaluation has allowed us to step back from offering early follow-up and from providing secondary care follow-up in cases of milder COVID-19, provided that patients have been advised to seek medical attention in the event of symptom recrudescence or if new clinical concerns arise. Our data provide reassurance that most patients clinically improve and continue to do so in the weeks following discharge.

Implications on wider service provision

Our follow-up pathway resulted in an increased workload for outpatient services: 263 secondary care referrals were generated. The most common respiratory subspecialty referral was to the ILD clinic, with notable numbers also referred to PE and pulmonary hypertension (PH) clinics, consistent with what is currently understood about the acute and long-term respiratory complications of COVID-19.[14,16,19]

There were several cardiology referrals after a local agreement that all patients with elevated troponin results would be referred for review. Although this practice was not part of national clinical guidelines, it was agreed locally that this cohort of patients warranted early referral given the prevailing uncertainties (at the time) surrounding the prognostic value of abnormal blood cardiac markers. Ninety-four per cent of echocardiographies were normal, suggesting that routine echocardiography for patients reviewed at 12 weeks was not necessary and could instead be guided by clinical history or specialist cardiac review. Cardiac findings in patients who were referred for cardiac magnetic resonance imaging have been reported previously.[10]

Referrals were also made to other secondary care specialties. As appropriate respiratory physiotherapy pathways were not fully set up and there was limited appreciation of the concept of

Table 2. Summary of investigation results and referral outcomes from 6-week and 12-week COVID-19 follow-up clinics

	6-week clinic, n=403		12-week clinic, n=309	
Number of patients reporting persistent breathlessness, n (%)	193 (47.9)		113 (36.6)	
Investigations	**Number performed**	**Results**	**Number performed**	**Results**
CXR	376	149/376 (39.6%) abnormal: > 91/149 (61.1%) abnormal CXRs in patients who also reported breathlessness > 91/193 (47.2%) patients who reported breathlessness also had abnormal CXRs	234	57/234 (24.4%) abnormal: > 28/57 (49.1%) abnormal CXRs in patients who also reported breathlessness > 28/113 (24.8%) patients who reported breathlessness also had abnormal CXRs
CT of the chest	28 in total: > 5 HRCT of the chest > 7 CTPA > 15 HRCT/CTPA combined > 1 CT of the chest with contrast	20/28 (71.4%) showed ILD: > 15/20 (75.0%) scans showing ILD in patients who also reported breathlessness > 15/193 (7.8%) patients who reported breathlessness also had a CT scan showing ILD 1/28 (3.6%) showed PVD: > 1/1 (100.0%) scan showing PVD was in a patient who also reported breathlessness > 1/193 (0.5%) patients who reported breathlessness also had a CT showing PVD	51 in total: > 27 HRCT of the chest > 2 CTPA > 21 HRCT/CTPA combined > 1 CT of the chest with contrast	30/51 (58.8%) showed ILD: > 17/30 (56.7%) scans showing ILD in patients who also reported breathlessness > 17/113 (15.0%) patients who reported breathlessness also had a CT showing ILD 1/51 (2.0%) showed PVD: > No scans showing PVD were in patients who also reported breathlessness > No patients who reported breathlessness also had a CT showing PVD
VQ SPECT-CT	N/A	N/A	59	2/59 (3.4%) showed TED only: > 1/2 (50.0%) showing TED only in a patient who also reported breathlessness > 1/113 (0.9%) patient who reported breathlessness also had a VQ SPECT-CT showing TED only 22/59 (37.3%) showed parenchymal disease only: > 13/22 (59.1%) showing parenchymal disease only were in patients who also reported breathlessness > 13/113 (11.5%) patients who reported breathlessness also had a VQ SPECT-CT showing parenchymal disease only 4/59 (6.8%) showed both TED and parenchymal disease: > No scans showing TED and parenchymal disease were in patients who also reported breathlessness > No patients who reported breathlessness also had a VQ SPECT-CT showing TED and parenchymal disease

Table 2. Summary of investigation results and referral outcomes from 6-week and 12-week COVID-19 follow-up clinics (Continued)

Exercise test	336 in total: > 330 STS > 6 6MWT	46/336 (13.7%) patients desaturated: > 30/46 (65.2%) who desaturated also reported breathlessness > 30/193 (15.5%) who reported breathlessness also desaturated	266 in total: > 204 STS > 62 6MWT	30/266 (11.3%) patients desaturated: > 12/30 (40.0%) who desaturated also reported breathlessness > 12/113 (10.6%) who reported breathlessness also desaturated
Spirometry	N/A	N/A	226	8/226 (3.5%) had an obstructive pattern: > 4/8 (50.0%) with an obstructive pattern also reported breathlessness > 4/113 (3.5%) who reported breathlessness also had an obstructive pattern 53/226 (23.5%) had a restrictive pattern: > 26/53 (49.1%) with a restrictive pattern also reported breathlessness > 26/113 (23.0%) who reported breathlessness also had a restrictive pattern
Plethysmography	N/A	N/A	62	25/62 (40.3%) were abnormal: > 14/25 (56.0%) with abnormal plethysmography also reported breathlessness > 14/113 (12.4%) who reported breathlessness also had abnormal plethysmography
Diffusion coefficient	N/A	N/A	66	40/66 (60.6%) were abnormal: > 20/40 (50.0%) patients with abnormal diffusion coefficients also reported breathlessness > 20/113 (17.7%) patients who reported breathlessness also had abnormal diffusion coefficients
Clinical referral outcomes[a]	**Referrals of the 403 patients seen in clinic, n (%)**		**Referrals of the 309 patients seen in clinic, n (%)**	
Additional COVID-19 clinic review: face-to-face	45 (11.2)		6 (1.9)	
Additional COVID-19 clinic review: telephone	145 (36.0)		18 (5.8)	
ILD clinic	4 (1.0)		59 (19.1)	
PE clinic	3 (0.7)		25 (8.1)	
PH clinic	0 (0.0)		6 (1.9)	
Respiratory infection clinic	1 (0.2)		11 (3.6)	

Table 2. Summary of investigation results and referral outcomes from 6-week and 12-week COVID-19 follow-up clinics (Continued)

Lung cancer clinic	1 (0.2)	1 (0.3)
General respiratory clinic	3 (0.7)	8 (2.6)
Discharged from COVID-19-related secondary care clinics	167 (41.4)	150 (48.5)
Other specialties	69 (17.1)	72 (23.3)
Cardiology: 97 Sports and exercise medicine: 17 Neurology: 10 Endocrinology: 5 Ear, nose and throat surgery: 3 Gastroenterology: 2 Rheumatology: 2 Breast clinic (2-week wait): 2 Haematology (2-week wait): 1 Nephrology: 1 Upper gastrointestinal surgery (2-week wait): 1 Urology (2-week wait): 1		

[a]Some patients were referred for both further review in COVID-19 clinic and for review in other specialty clinics. 6MWT = 6-minute walk test; CT = computed tomography; CTPA = computed tomography pulmonary angiography; CXR = chest X-ray; HRCT = high-resolution computed tomography; ILD = interstitial lung disease; PE = pulmonary embolism; PH = pulmonary hypertension; PVD = pulmonary vascular disease; STS = sit-to-stand test; TED = thromboembolic disease; VQ SPECT-CT = ventilation perfusion single-photon emission computed tomography with computed tomography fusion.

post-exertional malaise in long COVID at the time, some patients with a history of physical deconditioning or persisting fatigue were initially referred to sports and exercise medicine services. Radiological investigations resulted in incidental detection of pathology unrelated to COVID-19, including findings relating to malignancy (which resulted in referrals to multiple 2-week wait clinics) and goitres (necessitating referrals to endocrinology services). Referrals to neurology clinic were mainly for critical illness neuropathy.

Logistics

Our pathway was feasible due to exceptional circumstances that will be challenging to replicate. We had the staffing capabilities due to the availability of trainees who had returned to respiratory clinical training from out-of-programme activities or who had recently qualified from medical school as interim foundation year doctors. Consultants had flexibility to participate in regular multidisciplinary team meetings as many outpatient services had been curtailed. Our institution had the capacity to perform the diagnostic tests due to fewer requests from other outpatient services. The clinic cost was sufficiently high to require funding in addition to our block contract.

Limitations

Limitations of our service and subsequent data collection include that the cohort of clinic patients was predominantly made up of those COVID-19 patients who had a hospital admission relating to their illness. A clinical cohort with higher numbers of patients who did not require hospital admission may have changed the proportion of patients going on to 12-week follow-up, as well as their investigation and referral needs. The symptom information that was gathered pertained specifically to breathlessness and did not include cough, chest pain or fatigue. The assessment of patients' breathlessness was based on review of clinic letters and we were unable to quantify this further retrospectively using validated dyspnoea scores. Ethnicity data were not sufficiently specified in our healthcare records system for 17.7% of patients. We do not have information on the outcomes of patients who were offered appointments but did not attend, those who were deemed too frail or those who were out of area. Although we did not elicit formal feedback about patients' experiences in the clinic, informal feedback from those attending the service was positive. We do not have the data available to calculate the impact of the intensive service on quality-adjusted life years. The long-term physical and psychological outcomes of patients seen in this clinic are currently unknown. It is acknowledged that our findings pertain to patients who developed COVID-19 prior to the introduction of COVID-19 vaccinations in the UK and before the identification of a number of SARS-CoV-2 variants that have subsequently arisen since the start of the pandemic. Our findings should therefore be considered in the context of unvaccinated patients and the SARS-CoV-2 variants that were in circulation in the first half of 2020.

Changes in follow-up service

Following evaluation of our initial service and given the low rates of significant pathology that were detected at 6 weeks, we simplified our clinic pathway, reassured that in-depth follow-up for the vast majority of patients, when indicated, can safely take place at 12 weeks. We learnt that most level 1 patients do not

require specialist respiratory review and can be seen by primary care at 12 weeks. Recognising the high recovery rates at 6 weeks, we streamlined our service and focused secondary care follow-up for those with more severe acute disease. Hospital follow-up is now automatically offered only to those patients whose peak fraction of inspired oxygen (FiO_2) was ≥40%, those who are referred by their discharging medical teams due to clinical concerns or those on a long-term steroid wean. As most patients achieve radiographic resolution by 12 weeks, they receive a chest X-ray in the first instance rather than routine cross-sectional chest imaging. Patients who were intubated during admission still receive a CT of the chest. All other patients should have a chest X-ray arranged via their GP at 12 weeks post-discharge. Our data have reassured us that the 6-week phone call to patients is unnecessary and this has now stopped. The secondary care follow-up is funded as part of block contracts to our acute trust. GP-referred post-COVID-19 assessment clinics are funded by non-recurrent yearly national funds. Future work will include evaluation of the redesigned pathway.

Conclusion

Comprehensive assessment of COVID-19 patients is a complex, multidisciplinary process that is facilitated by close collaboration between specialties and joined up care pathways. Our initial resource-intensive follow-up protocol allowed us to justify a more rationalised approach for subsequent COVID-19 waves while remaining reassured that earlier intervention is not necessary for the majority of patients. This work, therefore, provides further support for pragmatic rather than intensive follow-up for patients recovering from COVID-19. ■

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Conflicts of interest

Kartik Kumar is a member of the editorial board for *FHJ*.

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