COVID-19 interim guidance on restarting elective work: Interventional radiology (image guided surgery) services

1. Introduction

In response to COVID-19, interventional radiology (IR) services paused elective and non-urgent procedures in line with national directive[1]. Emergency and non-elective work has continued.

IR services have been central to the ability of hospitals to maintain a degree of elective and emergent activity when other specialties have ceased elective surgery. There has been a change in referral patterns during the COVID-19 crisis; with cases referred for image guided interventions and treatments which might otherwise have been undertaken under general anaesthetic as open surgical procedures.

Many cohorts of patients are at significantly raised risk for COVID-19 infection with an extremely high mortality rate if infected e.g. oncology, acute and critical limb ischaemia (especially diabetic patients), transplantation and dialysis populations. Many patients with critical limb ischaemia and aortic aneurysms have been treated endovascularly, even when surgery would normally have been an option. IR has been able to maintain a virtual COVID-19 free environment with either geographical or temporal separation treating these patients with short day-case stays or reducing the need for intensive care unit/high dependency unit resources.

With the peak of COVID-19 cases abating, attention is now turning to how services return to deliver paused elective and non-COVID-19 related work. This guidance sets out practical steps and options for interventional radiology services to:

- create environments which minimise the risk of COVID-19 infection for patients needing IR services and maximise clinical efficiencies; and
- prioritise patients according to clinical need and risk.

This guidance does not cover procedures for COVID-19 positive patients, whose emergency needs have continued and will continue to be met. A patient with known or suspected COVID-19 should not be referred for non-urgent or elective IR procedures until such time as they are COVID-19 negative; at which point this guidance becomes relevant.

IR offers many benefits for patients including out-patient and day case treatment with shorter stays in hospital and more rapid recovery. Procedures have the advantage of being undertaken under local anaesthesia with or without intravenous sedation without the need for anaesthetic cover. During this recovery period IR will play an important role to provide safe elective therapies to a broader range of patients than before COVID-19 due to the risks of in-patient stay and post-operative immunosuppression.

Interventional oncology has been affected by the COVID-19 crisis, however IR units with their own day-case facilities (within IR departments), have been able to maintain a significant service. This has allowed these centres to continue cancer embolisation procedures e.g.

[1] https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/urgent-next-steps-on-nhs-response-to-covid-19-letter-simon-stevens.pdf

TACE (in combination with 'clean' in-patient facilities). Interventional radiologists have also been able to maintain some thermal ablation services for the treatment of potentially curable primary tumours e.g. renal cancer and hepatocellular cancer.

Generic interim COVID-19 guidance has been published which is pertinent to all radiology services.

As more information becomes available, it is likely that this guidance will be updated or withdrawn. The rate at which IR services will restart non-urgent and elective work paused in light of COVID-19 will depend on local conditions. The availability of equipment and ability to stratify and separate patients will also vary locally. This guidance should be interpreted and applied accordingly.

2. Environment

Trusts and health boards should ensure as far as is possible that the risk of cross-contamination is eliminated or reduced to an acceptable level between COVID-19 free and potential COVID-19 positive areas within a hospital setting for both staff and patients.

It is essential to gain the trust of patients attending acute hospitals that have in-patient COVID-19 presumed or positive patients. IR services should clearly:

- define in-patient and out-patient flows with separation of these patients and staff to ensure minimal risk of secondary COVID-19 transmission
- communicate to patients the steps taken to minimise the risk of COVID-19 transmission for the duration of their hospital attendance.

Trusts and health boards may be able to develop COVID-19 free hospital sites in a number of ways:

- with the centralisation of COVID-19 patients either within their own trust structure
- with collaboration with neighbouring trusts as a network
- using the independent sector.

If this is not possible then services should separate patients using geographical or temporal methods or a combination of the two.

Geographical separation involves the defining of a separate area with physical barriers e.g. on separate floors of the hospital. This is particularly aided by the use of, or establishment of, dedicated IR day case areas (with experienced nursing support).

Temporal separation involves separating COVID-19 positive and COVID-19 negative activity in time e.g. morning activity for outpatients, afternoon for in patients. Equipment and room decontamination are required before treating outpatients. Utilising the morning for outpatient activity allows deep cleaning to occur in the evenings, leading to a more efficient usage.

Services should take steps to ensure separate waiting and recovery areas for COVID-19 positive and suspected COVID-19 patients from COVID-19 negative patients. To achieve this, services should consider a change in practice where elective and outpatient cases are either:

1. recovered within the interventional room
2. recovered within the IR day case unit

3. or transferred immediately back to a remote day case facility.

Key to separation is knowledge of a patient's COVID-19 status. This is discussed in detail in section 6 below.

4. Facilities

IR services are more efficient and effective when they have the ability to admit and discharge their own patients within their own day-case facilities and to consult patients in advance for discussion and consent. Access to dedicated day case IR beds, separate to inpatient areas, has the potential to improve capacity and reduce patient concern about attending hospital in acute settings treating COVID-19 positive patients.

Where this is not possible, IR services should consider the use of all potential interventional radiology facilities available to allow elective activity to restart in COVID-19 negative patients. This may be an interim measure to gain the trust of the public, facilitate attendance and also allow for necessary physical changes to be arranged within departments. Examples include:

- the re-direction of services to dedicated hub sites in COVID-19 free hospitals,
- use of hybrid suites
- use of theatres with image intensifiers
- use of independent sector services, providing appropriate governance structures are in place and the service has access to the equipment required to cover all emergency eventualities (including emergency IR devices)

Many hospitals now have ambulatory day case units with attached waiting area, beds and theatres, physically separate from the main inpatient hospital areas. IR services should evaluate the feasibility of using such units. If viable, this allows for immediate separation for outpatients with dedicated entrances and can be transformed quickly into an outpatient/day case interventional area. Simple stratification of patients to the most appropriate area will allow appropriate activity e.g. tube changes, biopsy, nephrostomy, sclerotherapy, PTC etc.

As far as is practicable, day case facilities (temporary or in development) should be sited close to the IR department to improve efficiency; optimising staff time for patients. Interventional radiology teams, including nurses and radiographers, should be responsible for the care of patients while they undergo their day case procedures.

If they have not already, services should develop or update their standard operating procedures (SOPs) in light of their recovery planning, and define clear routes of communication with primary care and other secondary care providers.

IR services should liaise closely with colleagues in the anaesthetics department for all interventions requiring general anaesthetic (GA) to ensure that their availability is factored into scheduling. In all cases requiring intubation and extubation services should minimise the number of staff in the room, and equip those in the room with PPE in accordance with national guidelines for aerosol generating procedures, and local risk based assessment.

5. Stratification of patients

IR services should build a local recovery team to co-ordinate and deliver the plan, led by the IR clinical director. The local team should develop policies and pathways to manage the

whole care pathway, communicating these to the entire team, including interventional radiology nurses and radiographers, liaising with other hospital sites and related specialties as needed to deliver safe patient care.

Trusts and health boards should hold a record of all cases that have been deferred and the criteria used to do so. IR services should prioritise those cases using criteria based on clinical urgency and risk. The primary goal should be to keep patients in the community and prevent urgent or emergency admissions. Discussion with clinical teams, most likely at multi-disciplinary team meetings (MDTs), should ensure appropriate referral to interventional radiology.

In determining priority for cases, IR services may use the Royal College of Surgeons' Clinical Guide [2]. Patients may be classified into the following groups:

Priority level	Description
1	Emergency – needed within 24 hours
2	Urgent – needed within 72 hours
3	IR can be deferred for up to four weeks
4	IR can be deferred for up to three months
5	IR can be deferred for more than three months

Appendix 1 provides examples of how services should prioritise IR procedures.

For cancer patients where interventional radiology forms part of the patient's primary treatment care pathway, specific guidance has been developed by NHS England and should be used by IR services in prioritising cases[3]. The devolved nations may have developed equivalent guidance.

There are a number of factors / co-morbidities that are likely to have a poorer prognosis with COVID-19:

- Age over 70 years
- Pre-existing cardiovascular disease
- Pre-existing respiratory disease
- Immunosuppressed/immunocompromised patients.

Services should assess people in these groups in particular based on clinical need, co-morbidities and fitness, as well as their home circumstances.

Each department should assess the availability of potential sites for the different types of interventional work and then stratify patients to different areas to maintain separation and prevent secondary spread of COVID-19. For example, tube changes, nephrostomies, PTC, biopsies, and abdominal drains, to mention a few, can be performed quite safely in an ambulatory theatre environment, with ultrasound and image intensifier equipment available.

[2] https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0221-specialty-guide-surgical-prioritisation-v1.pdf
[3] www.england.nhs.uk/coronavirus/secondary-care/otherresources/specialty-guides#cancer

All efforts should be made to perform image guided surgical procedures as a day case; utilising closure devices, haemostatic plugs. Timings of the procedure can help in this matter. However, when this is not possible, and an overnight stay is required dedicated beds or wards should be identified in a non-COVID-19 area.

6. Pre-appointment

IR services should use of telephone or video conference facilities for virtual consultations, pre-assessments and follow-up, where this is feasible, to reduce the number of patient attendances.

IR services should contact patients routinely prior to their interventional procedure for a telephone or video pre-assessment. This assessment should include questions regarding support at home post procedure, health (recent temperature, cough – COVID-19 risk etc.), anti-coagulation and other risk factors.

Discussions should include an explanation regarding the trust steps being undertaken to reduce their COVID-19 risk for their day case procedure and provide reassurance. The importance of social distancing, minimising crowding and separate entrances should be reinforced.

Information should be supplied regarding attendance, directions, time of procedure and likely recovery time prior to discharge to allow an efficient service with minimal patient stay. It is likely that a relative will need to provide transport, and this should preferably be someone with whom they have been sharing a home. Patient information should be supplied via email/post.

Services should consider the routine screening of COVID-19 status of all patients prior to attendance for the procedure. Patient testing as an outpatient prior to their procedure allows the IR team to assure itself those patients who:

- Present a negative RT-PCR within 48 hours
- Have experienced no symptoms for seven days and
- (where time allows) have self-isolated for 14 days[4]

minimise the risk of COVID-19 contamination, improving confidence in the environment.

All services may wish to consider asking all patients to wear surgical masks as an additional safeguard. This should be decided based on:

- local COVID-19 prevalence
- the availability of testing
- the requirement for pre-procedure self-isolation and
- the individual risk to each patient.

7. Staffing

Pre-COVID-19, it was acknowledged that the IR workforce across the UK was insufficient to meet demand for IR services as needed. This issue is exacerbated by the shortage of nursing and radiographic staff and further compounded by the impacts of COVID-19, particularly with staff needing to self-isolate.

[4] https://www.rcsed.ac.uk/media/564199/protocol-for-pre-op-ct-during-covid19-pandemic-pdf.pdf

During the COVID-19 crisis many IR services have been reconfigured to adapt to the challenges specific to COVID-19. This has led to a significant number of centres developing separate diagnostic and interventional radiology rota's covering 24/7. As the demands of COVID-19 reduce, IR services should consider their continuation to allow the introduction of elective work and to mirror those of colleagues, resulting in improvements in team working.

The geographical considerations necessary to reduce secondary hospital transmission of COVID-19 are challenging but allow services to consider alternative temporary (or permanent) ways of working. This also allows a greater use of a larger pool of radiographers, utilising them flexibly to respond to changing demands. Interventional nursing staff are also in high demand, especially when staff may be self-isolating in accordance with national requirements. IR services should specifically consider the exact requirements of staff members for each specific case and IR environment to ensure safe and efficient services via local planning.

All staff should follow the current recommendations for PPE usage.

8. Discharge

IR services should ensure that patients are discharged as soon as is practicable after their procedure to reduce unnecessary ward stays. Services should define formal post procedure protocols and standard operating procedures, modified to accommodate COVID-19 recovery plans. Services may wish to consider use of nurse-led discharge to avoid unnecessary delays. Before discharge services should ensure that patients and their carers are provided with contact details (24/7) should they have concerns. Where necessary, services should arrange for follow-up arrangements to be conducted via telephone, video or face-to-face consultations as appropriate. A discharge summary should be provided at the time of discharge, with a copy for the patient's GP (or linked electronically directly to the GP practice).

9. Paediatric interventional radiology (PIR) services:

PIR services should use all the guidance detailed above. In addition, PIR services should consider the following provisions:

(a) General anaesthetic (GA)

The majority of PIR is performed under a GA, which in the current environment is significantly limited. PIR services should consider wider use of Entonox™ and other forms of sedation for children who may tolerate it where possible.

In PIR cases where GA is not used, services should consider converting non-GA day case procedures into out-patient procedures, to reduce child and family contact with wards.

(b) Child-friendly resources

PIR services should encourage staff to use available resources to explain COVID to children if required. These include:

- https://www.rcpch.ac.uk/resources/covid-19-resources-parents-carers

- Coronavirus: A book for children. Written by Elizabeth Jenner, Kate Wilson, and Nia Roberts. Illustrated by Axel Scheffler.
- COVIBOOK for children younger than seven years
- The United Nations Office for the Coordination of Humanitarian Affairs. Inter-Agency Standing Committee (a children's book for children approximately six to 11 years of age in various languages)

(c) Non face-to-face contact

For PIR clinics, services should consider use of video calls over telephone calls. This often allows the child to engage better with the conversation.

(d) Accompanying carers

Most paediatric centres are limiting inpatient presence of carers to one carer per family to reduce secondary transmission. This should be followed in PIR with only one carer per family allowed to accompany the child to IR.

(e) PPE

PIR teams should recognise that the wearing of full PPE can be frightening for a child. Where possible, services should try to source child-friendly masks/visors and ensure that members of the PIR team write their names clearly on gowns or hats for the child to see.

References

- *Interventional radiology and COVID-19: evidence based measures to limit transmission*. Chandy et al. Diagn Interv Radiol 2020; DOI 10.5152/dir.2020.20166

- General BSIR COVID-19 advice: https://www.bsir.org/society/members-information-1/general-advice-re-covid-19/

- Public Health England (PHE) PPE advice: https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/covid-19-personal-protective-equipment-ppe

- BSIR PPE advice: https://www.bsir.org/mediacentre/news/bsir-guidance-regarding-ppe-use-in-ir-in-patients-proven-or-suspected-of-covid-19-infection/

We would like to give special thanks to Dr Ian McCafferty, Dr Phil Haslam, Professor Mo Hamady, Dr Hiliary White and Dr Trevor Cleveland for their contribution in writing this guidance.

Appendix 1: Examples of interventional radiology procedure priorities.

Priority	Definition	Interventions
Priority 1	Emergency – needed within 24hrs	Embolisation for acute bleeding TIPSS/BRTO for acute bleeding Drainage of sepsis (urosepsis, biliary, other) TEVAR EVAR Acute SVCO Endovascular treatment for acute ischaemia Temporary venous access for dialysis
Priority 2	Urgent – needed within 72hrs	Endovascular treatment for critical limb ischaemia Permanent venous access for dialysis Central venous access and PICC Inferior vena cava filter insertion Nephrostomy for uro-obsruction PTC for biliary obstruction
Priority 3	Can be deferred for up to 4 weeks	Endovascular treatment for chronic limb ischaemia Malignant tumour ablation TACE / SIRT Portal venous embolisation Gastrostomy Percutaneous biopsy
Priority 4	Can be deferred for up to 3 months	Endovascular management of AVM's Endovascular management of chronic venous obstruction TIPSS for ascites Endovascular treatment of vascular aneurysm Tube changes Inferior vena cava filter retrieval Tunnelled pleural and abdominal drains
Priority 5	Can be deferred for >than 3 months	Management of low flow vascular malformations Varicocele embolisation Pelvic venous congestion Prostate artery embolisation Uterine artery embolisation

Appendix 2: Summary of advice

Environment/ Facilities	**Single IR room suite**	**Two or more IR room suite**
	Elective (COVID free) – morning Acute/emergent inpatient – afternoon	Separate rooms: 1 room for acute/emergent inpatient 1 room for COVID free elective cases
	Use of mobile C-arm in surgical theatre to create second IR facility	Segregate access into each room. Recover IPs in the IR room Use IR recovery area for elective cases
	Elective	**Acute/emergent**
Patient stratification	COVID negative	COVID positive/ suspected
	Prioritise according to NHSE/JRCS priority assessment tool (Appendix 1)	
Pre-procedure	Ascertain COVID status	Ascertain COVID status
	Delay procedure by 2 weeks if COVID suspected or positive	Consider delaying COVID suspected or positive patients if clinically appropriate
	Perform as day case procedure, where possible	Send patient information to ward for patient to read ahead of procedure
	Electronic/postal patient information leaflets (PIL)	
	Use telephone or videoconferencing for outpatient consultation and pre-assessment	
	Ensure patient's symptoms have not substantially altered since original referral to make proposed intervention inappropriate	
	Ensure imaging is 'current' and does not need repeating	
Staffing	Where possible, use separate teams of staff for elective and acute/emergent lists	
	If possible, increase pool of radiographic staff able to assist in IR procedures. This may require a period of refresher or 'top-up' training	
	Consider staffing requirements for each case, in advance, to ensure correct skills available in the IR team	
	Follow National guidance for PPE	
Discharge	Review and discharge in a timely manner post procedure	Review patients on the ward to ensure optimal post procedure care is being followed and to prevent unnecessary delay in discharge following an IR procedure
	Utilise nurse-led discharge to reduce delays	
	Provide 24/7 contact details to patient and/or their carers	
	Provide a discharge PIL so patients are aware of what to expect once they go home, symptoms they may experience and likely recovery time	
	Provide clear follow-up arrangements	
	Provide a GP discharge summary at time of discharge	