



SCTS

**Society for Cardiothoracic Surgery
in Great Britain and Ireland**

Provision of Cardiothoracic Surgical Cover for Trauma in United Kingdom & Ireland

Donald Whitaker, Simon Kendall, Narain Moorjani, Steve Woolley, Juliet King,
Marjan Jahangiri and Richard Page

**Produced on behalf of the Society for Cardiothoracic Surgery in Great Britain
& Ireland (SCTS)**

Aims

This SCTS position paper regarding the provision of care for patients sustaining cardiothoracic trauma in the UK and Ireland aims to guide those involved in commissioning and dealing with cardiothoracic trauma with particular emphasis on the interaction and collaboration of cardiac, thoracic and trauma surgeons.

Introduction

The reconfiguration of trauma management with the institution in 2010 of trauma networks and trauma units feeding in to major trauma centres (MTC)¹ has led to improvement in mortality². Cardiothoracic units have had to adapt without any recent national guidance or support.

A recent audit of cardiothoracic trauma in a major UK trauma centre showed that the vast majority of patients sustaining a cardiothoracic injury do not need the involvement of a cardiothoracic surgeon. Most patients can be managed, at least initially, either conservatively or with a chest drain under the care of trauma surgeons. A small minority will require subsequent urgent operative intervention by a cardiac or thoracic surgeon³.

A separate audit of the current provision of cardiothoracic care for trauma in the UK has shown a variety of models that all appear to be effective and address local demand, with assistance to first line trauma surgeons provided by either a cardiac or thoracic surgeon, or both.

It is not always possible for cardiac, thoracic or cardiothoracic surgeons to be available for salvage life-saving operations in the resuscitation rooms of the major trauma centres. This is for two reasons:

1. It is not feasible to have a senior cardiothoracic surgeon resident 24 hours a day, 7 days a week available for the resuscitation room with the necessary theatre team and cardiopulmonary bypass equipment;
2. It is not practical to expect cardiothoracic surgeons to be able to get to the resuscitation room in a timely and reliable manner due to variations in geography and co-location with the major trauma centre.

Life-saving salvage surgery in the resuscitation room needs to be performed by the trauma team. They will need to perform the emergency incision and control life threatening haemorrhage and / or relieve cardiac tamponade. Cardiothoracic surgeons will be simultaneously called to take over the management of the patient for restorative surgery, either in the resuscitation room or transferred to a cardiothoracic theatre (with or without the necessary imaging).

Cardiothoracic surgeons are able to help train and educate trauma teams to perform the necessary incisions and initial procedures in salvage surgery.

GIRFT Report and Recommendations

The GIRFT report⁴ describes the variation in current provision for cardiothoracic trauma. It highlights the fact that there are a number of major trauma centres where there is no on site thoracic surgical cover. Six major trauma centres have thoracic surgical cover from nearby trusts and at three major trauma centres trauma the cardiothoracic cover is provided by the cardiac surgeons.

The GIRFT report recommends that major trauma centres are covered by published rotas for both thoracic and cardiac trauma. In line with this recommendation, the report also recommends that “providers” should end the practice of using full-time cardiac-dedicated surgeons to provide emergency thoracic surgery cover.

Thoracic Surgery Service Specification

The English Thoracic Surgery Service Specification document⁵ states that *“Major trauma centres require input from specialised cardiac and thoracic surgeons. Although the number of patients actually affected by chest trauma requiring this service is small, on such occasions the input of an appropriately trained specialist surgeon can be life-saving. The current standard is that a specialist cardiothoracic surgeon is available within 30 minutes to assist in the care of those patients with life-threatening chest trauma. There is significant variation throughout the country as to how this is organised for the trauma centre by the regional cardiac and thoracic units. In some cases, all trauma is looked after by one side of the specialty, leading to concerns over inferior care for patients – for example a patient with cardiac trauma is cared for by a thoracic surgeon and vice-versa. With increasing specialisation and separation between cardiac and thoracic surgical services, there will be two emergency rotas for surgeons to be available to help with trauma, whereas in most cases there is currently only one. There will therefore be an improvement in the care of patients with major chest trauma as a result of the changes specified in this document.”*

The SCTS agrees that the separation of cardiac and thoracic surgical services as envisaged in the service specification is a worthy aspiration with numerous advantages for patients. However, given the current geographical configuration of cardiac and thoracic surgical units in their relation with the nation’s major trauma centres, the Society does not believe this separation is currently achievable for the emergency care of patients suffering cardiothoracic trauma.

Current Situation

Information on the current situation has been obtained by a survey of all cardiothoracic units in the United Kingdom & Ireland. Further information has been obtained from the SCTS BORS meeting (October 2018) that included the presentation of an audit from an MTC, the GIRFT report and an SCTS cardiothoracic trauma conference call (February 2019).

The main findings of an audit from an individual MTC were:

1. There has been a significant (more than two-fold) increase in patients presenting with chest injuries over an 8-year period.
2. The vast majority of injuries are thoracic (95%) rather than cardiac (5%).
3. Of those with cardiothoracic trauma, 48% of injuries are isolated chest injuries and 52% have associated cerebral, orthopaedic or abdominal injuries.
4. The majority of chest trauma patients (76%) were managed non-operatively with (56%) or without (20%) a chest drain.
5. Of the 24% requiring surgery, only 5% were cardiothoracic operations.

It was proposed that cardiac surgeons used to dealing with trauma are able to do so safely. It was clear from discussion among representatives that there are considerable variations in the way cardiothoracic trauma is covered around the countries. This variation was again detailed in the conference call. In some units, cardiothoracic trauma is covered by cardiac surgeons only, in others thoracic surgeons only and sometimes it is covered by both.

Survey –

- 1) Replies were received from all 43 cardiothoracic units in the United Kingdom & Ireland (see appendices 1 and 2).
- 2) In 20 units, cover for trauma was provided by both cardiac and thoracic surgeons, in 10 cardiac surgeons and in 7 thoracic surgeons. In 3 units, mixed practice cardiothoracic surgeons provide cover and in 3 unit no cover was needed.
- 3) 6 units had a specific rota for trauma, whereas 37 did not.
- 4) In the 18 units in which there was a time in which surgeons felt they were expected to attend for an emergency, this time varied from 15 to 30 minutes. 25 units reported no specific expected time for attendance.
- 5) Frequency of request for immediate attendance varied from 0 to 150 times per year, with a median of 10 requested attendances per year.
- 6) 14 of the 43 units covered an MTC on site. For those units covering an MTC off site, the distance from base hospital to the MTC covered varied from 100 metres (Papworth) to 15 miles (Blackpool).
- 7) On-site cover varied from core surgical trainees to trauma consultants.

Interestingly, several respondents identified their unit as a major trauma centre, when actually it is designated as a trauma unit.

In summary, the survey has highlighted the necessary variation to provide for cardiothoracic trauma.

Discussion

The GIRFT report sets standards for the provision of care of patients sustaining cardiothoracic trauma without presenting evidence why these standards are necessary. In

the UK, there are different models for these patients that are effective in their delivery. Outcomes should be carefully monitored to provide evidence if change is necessary. In Kings College Hospital, there are mainly cardiac surgeons covering a MTC, with the thoracic surgeons working at a separate nearby trust. At Middlesbrough, cardiac surgeons cover the MTC within the limits of a category A on-call (can attend the hospital with urgency) and thoracic surgeons are available as category B (can give telephone advice and attend hospital as necessary).

There is evidence that cardiac surgeons with sufficient experience are able to cover cardiothoracic trauma. There is clear evidence that the vast majority of thoracic injuries can be safely managed by a trauma team with general surgery / intensive care training, with selective input from thoracic and cardiac surgeons.

Publishing rotas for both thoracic and cardiac on call cover, as recommended by the GIRFT report, is achievable but it will also be necessary to define in those rotas which surgeons are urgently available and those that are available as necessary. During the working day, the on-call surgeon will have a variety of commitments, including an operating list; non-trauma cardiothoracic emergencies; outpatients or ward rounds. It is not practical nor cost effective within surgeons' job plans to be exclusively available to cover trauma on-call.

Recommendations

1. Given the variation in trauma cover by cardiothoracic surgical units throughout the United Kingdom & Ireland, it is not appropriate to be prescriptive about the required model of care. Nevertheless, it is vitally important that MTCs know how to obtain rapid cardiothoracic surgical advice and help when necessary. Therefore, all cardiothoracic units should publish a rota or rotas detailing the arrangements for covering cardiothoracic trauma. This may take the form of separate thoracic and cardiac surgical rotas with both specialties taking equal responsibility. Alternatively, units may prefer to have one specialty 'first on-call' with the other reserved for specific cases and to be contacted by the first on-call service when needed. The first on-call service can be provided by either cardiac or thoracic surgery.
2. It is not practical for on-call cardiothoracic surgeons to be able to attend in an appropriate timeframe for salvage procedures (i.e. immediately). They should, however, be available for immediate telephone advice and attend urgently when available.
3. MTCs should ensure that there are on-site trauma teams available to perform salvage incisions, control major haemorrhage, relieve tamponade and insert chest drains. This should be the responsibility of the trauma team. Cardiothoracic surgeons, however, will be involved in the training of these trauma teams.
4. Cardiothoracic units should work with their local trauma teams for education and training, as well as audit.

5. Dedicated trauma theatres and wards are encouraged for improving care of cardiothoracic trauma patients. Alternatively, necessary capacity should be provided in cardiothoracic units.
6. Cardiothoracic units should define who has managerial accountability for trauma. The specifics of this role would depend on individual units but would include:
 - a) setting up of a published rota, providing both thoracic and cardiac surgical cover for the local major trauma centre / trauma unit, and supervising the implementation of the rota
 - b) organising education, training and audit of cardiothoracic trauma
 - c) collaborating on the writing of local guidelines and standard operating protocols for trauma

References

1. National Audit Office. Major Trauma Care in England. London: The Stationery Office, 2010; 4. <https://www.nao.org.uk/wp-content/uploads/2010/02/0910213.pdf>
2. McCullough AL, Haycock JC, Forward DP, Moran CG. Major trauma networks in England. *Br J Anaesth*. 2014 Aug;113(2):202-6.
3. Chacko J, Whitaker D, et al. 8 Year Audit of Cardiothoracic Trauma at a Major Trauma Centre. Presented at the Annual Meeting of the Society for Cardiothoracic Surgery (SCTS) in Great Britain & Ireland, March 2019.
4. Richens D. Cardiothoracic Surgery GIRFT Programme National Specialty Report (March 2018). <https://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/04/GIRFT-Cardiothoracic-Report-1.pdf>
5. Thoracic Surgery Service Specification (July 2017). <https://www.england.nhs.uk/wp-content/uploads/2017/07/thoracic-surgery-service-specification.pdf>

Appendix 1. Cardiothoracic surgery units and their associated major trauma centres

Cardiothoracic surgery unit	Major trauma centre (MTC) covered by the cardiothoracic surgery unit	Co-Location with an MTC?	Distance to the MTC (miles)	Cover of a co-located A&E (if not at an MTC)	First-call service covering trauma
England					
Basildon University Hospital	N/A	No	N/A	Yes	Cardiac & Thoracic
Queen Elizabeth Hospital, Birmingham	Queen Elizabeth Hospital, Birmingham	Yes	N/A	No	Cardiac
Heartlands Hospital, Birmingham	Queen Elizabeth Hospital, Birmingham	No	6	No	Thoracic
Victoria Hospital, Blackpool	Royal Preston Hospital	No	15	Yes	Cardiac & Thoracic
Royal Sussex County Hospital, Brighton	Royal Sussex County Hospital, Brighton	Yes	N/A	No	Cardiac
Bristol Royal Infirmary	Southmead Hospital, Bristol	No	4	Yes	Thoracic
Royal Papworth Hospital, Cambridge	Addenbrooke's Hospital, Cambridge	Yes	100 metres	No	Cardiac & Thoracic
University Hospital Coventry & Warwickshire	University Hospital Coventry & Warwickshire	Yes	N/A	No	Cardiac & Thoracic
Castle Hill Hospital, Hull	Hull Royal Infirmary	No	5	No	Cardiac & Thoracic
Leeds General Infirmary	Leeds General Infirmary	Yes	N/A	No	Thoracic & Cardiac
St. James' Hospital, Leeds	Leeds General Infirmary	No	3	Yes	Thoracic
Glenfield Hospital, Leicester	N/A	No	N/A	No	Cardiac & Thoracic
Liverpool Heart and Chest Hospital	Aintree University Hospital Liverpool	No	8	No	Thoracic
Guy's Hospital, London	Kings College Hospital, London	No	2	No	Cardiac
Hammersmith Hospital, London	St Mary's Hospital, London	No	4	No	Cardiac & Thoracic
Harefield Hospital, London	N/A	No	N/A	No	N/A
Heart Hospital, London	N/A	No	N/A	No	N/A
Kings College Hospital, London	Kings College Hospital, London	Yes	N/A	No	Cardiac
Royal Brompton Hospital, London	N/A	No	N/A	No	N/A
St. Bartholomew's Hospital, London	Royal London Hospital	No	2	No	Cardiac
St. George's Hospital, London	St George's Hospital, London	Yes	N/A	No	Cardiac & Thoracic
St. Thomas' Hospital, London	N/A	No	N/A	Yes	Cardiac
Manchester Royal Infirmary	Salford Royal Hospital and Manchester Royal Infirmary (Collaborative)	Yes	N/A	No	Cardiac
Wythenshawe Hospital, Manchester	Salford Royal Hospital and Manchester Royal Infirmary (Collaborative)	No	8 / 13	Yes	Cardiac & Thoracic

James Cook University Hospital, Middlesbrough	James Cook University Hospital, Middlesbrough	Yes	N/A	No	Cardiac
Freeman Hospital, Newcastle	Royal Victoria Infirmary, Newcastle	No	3	No	Thoracic
Norfolk & Norwich University Hospital	N/A	No	N/A	Yes	Thoracic
Nottingham City Hospital	Queens Medical Centre, Nottingham	No	5	No	Cardiac & Thoracic
John Radcliffe Hospital, Oxford	John Radcliffe Hospital, Oxford	Yes	N/A	No	Cardiac & Thoracic
Derriford Hospital, Plymouth	Derriford Hospital, Plymouth	Yes	N/A	No	Thoracic
Northern General Hospital, Sheffield	Northern General Hospital, Sheffield	Yes	N/A	No	Cardiac & Thoracic
Southampton General Hospital	Southampton General Hospital	Yes	N/A	No	Cardiac & Thoracic
Royal Stoke University Hospital	Royal Stoke University Hospital	Yes	N/A	No	Cardiac & Thoracic
New Cross Hospital, Wolverhampton	N/A	No	N/A	Yes	Cardiac & Thoracic
Ireland					
Cork University Hospital	N/A	N/A	N/A	Yes	Cardiothoracic
Mater Misericordiae University Hospital, Dublin	N/A	N/A	N/A	Yes	Cardiac
University Hospital Galway	N/A	N/A	N/A	Yes	Cardiothoracic
Northern Ireland					
Royal Victoria Hospital, Belfast	N/A	N/A	N/A	Yes	Cardiac & Thoracic
Scotland					
Aberdeen Royal Infirmary	N/A	N/A	N/A	Yes	Cardiothoracic
Royal Infirmary of Edinburgh	N/A	N/A	N/A	Yes	Cardiac & Thoracic
Golden Jubilee National Hospital, Glasgow	N/A	N/A	N/A	Yes	Cardiac & Thoracic
Wales					
University Hospital Cardiff	N/A	N/A	N/A	Yes	Cardiac & Thoracic
Morriston Hospital, Swansea	N/A	N/A	N/A	Yes	Cardiac

A&E = Accident & emergency department

Appendix 2. Major trauma centres and their associated cardiothoracic surgery units

Major trauma centre (MTC)	Cardiothoracic (CT) surgery unit providing emergency cover to the MTC	Co-location of CT surgery	Distance from MTC (miles)	First-call service covering MTC
England				
Queen Elizabeth Hospital, Birmingham	Queen Elizabeth Hospital, Birmingham	Yes	N/A	Cardiac
	Heartlands Hospital, Birmingham	No	6	Thoracic
Royal Preston Hospital	Victoria Hospital, Blackpool	No	15	Cardiac & Thoracic
Royal Sussex County Hospital, Brighton	Royal Sussex County Hospital Brighton	Yes	N/A	Cardiac
Southmead Hospital, Bristol	Bristol Royal Infirmary	No	4	Thoracic
Addenbrooke's Hospital, Cambridge	Royal Papworth Hospital, Cambridge	Yes	100 metres	Cardiac & Thoracic
University Hospital Coventry & Warwickshire	University Hospital Coventry & Warwickshire	Yes	N/A	Cardiac & Thoracic
Hull Royal Infirmary	Castle Hill Hospital, Hull	No	5	Cardiac & Thoracic
Leeds General Infirmary	Leeds General Infirmary	Yes	N/A	Thoracic & Cardiac
	St James' Hospital, Leeds	No	3	Thoracic
Aintree University Hospital, Liverpool	Liverpool Heart and Chest Hospital	No	8	Thoracic
St Mary's Hospital, London	Hammersmith Hospital London	No	4	Cardiac & Thoracic
St George's Hospital, London	St George's Hospital London	Yes	N/A	Cardiac & Thoracic
Royal London Hospital	St. Bartholomew's Hospital, London	No	2	Cardiac
King's College Hospital, London	King's College Hospital, London	Yes	N/A	Cardiac
	Guy's Hospital, London	No	2	Cardiac
Salford Royal Hospital and Manchester Royal Infirmary (Collaborative)	Manchester Royal Infirmary	Yes	N/A	Cardiac
	Wythenshawe Hospital, Manchester	No	8 / 13	Thoracic
James Cook University Hospital, Middlesbrough	James Cook University Hospital, Middlesbrough	Yes	N/A	Cardiac
Royal Victoria Infirmary, Newcastle	Freeman Hospital	No	3	Thoracic
Queen's Medical Centre, Nottingham	Nottingham City Hospital	No	5	Cardiac & Thoracic
John Radcliffe Hospital, Oxford	John Radcliffe Hospital, Oxford	Yes	N/A	Cardiac & Thoracic
Derriford Hospital, Plymouth	Derriford Hospital, Plymouth	Yes	N/A	Cardiac & Thoracic
Northern General Hospital, Sheffield	Northern General Hospital, Sheffield	Yes	N/A	Cardiac & Thoracic
Southampton General Hospital	Southampton General Hospital	Yes	N/A	Cardiac & Thoracic
Royal Stoke University Hospital	Royal Stoke University Hospital	Yes	N/A	Cardiac & Thoracic

