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Research Article

The National Surgical Training Scheme in Cardiothoracic Transplantation: Training Competent Transplant Surgeons in the United Kingdom

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Abstract

The initiatives to increase the rate of deceased donors per million population and increase organ utilisation rates by the NHS together with the greater use of mechanical circulatory support devices will inevitably result in a need for more transplant surgeons over the next decade. We assessed the outcome of a new training fellowship scheme to date and surveyed the projected national workforce prediction in order to determine the quality of the training provided and if the scheme can match the future demand.

Two independent surveys were conducted in 2017. Electronic trainee surveys of the national Fellows and a workforce prediction survey of all the transplant centers in the United Kingdom (UK).

Since 2009 nine Fellows were appointed; eight responded to the survey (89%). The majority had completed general cardiothoracic training (equivalent to US board certification) prior to taking up the Fellowship (n=6). Average length of Fellowship was 15 (SD=3) months. The satisfaction with the programme had a weighted average score of 7.13 (Scale=0-10). All but one fellow secured a consultant position, 50% of whom within 6 months of completion of their transplant training. There are currently around 36 cardiopulmonary transplant surgeons in the UK, many of whom would retire from transplantation at the age of 60. In the short term; units themselves report a likely recruitment need of 11 new posts between 2017 to 2023. This accounts for anticipated increase in activity in the next decade. Therefore training competent, highly specialized transplant surgeons have never been more essential.

We conclude that the training scheme has so far successfully addressed the national workforce deficit with highly trained and competent cardiothoracic transplant surgeons. With many retirements anticipated from 2023 and given that recruitment through the national Fellowship program will require an 18 month lead time. Early planning is therefore essential.

Keywords: Cardiothoracic; Cardiothoracic; Transplantation; Training; Competency; Quality; Satisfaction

Introduction

In 2009, National Health Service Blood and Transplant (NHSBT) and Speciality Advisory Committee (SAC) in cardiothoracic surgery jointly reviewed the national status of surgical staffing in cardiopulmonary transplantation. They recognized that the number of transplant surgeons was insufficient to meet demand over the next decade. So a National Fellowship was established initially in Newcastle and Cambridge later in Manchester. The aim of the fellowship was to deliver transplant-specific training and supply two NHS consultants every 18 months in order to sustain workforce predictions. The Fellowship positions were approved in advance by the SAC, and quality assured by both the SAC and the local Schools of Surgery. The post was also recognized by the Joint Committee in Surgical Training (JCST). The Fellowship covered training in organ procurement and preservation, Heart & lung transplantation, Implantation of extracorporeal and paracorporeal MCS, All elements of pre and post-operative care and patient selection, while continuing experience in general cardiac or thoracic surgery to maintain skills. There were other opportunities for training such as international scholarship awards and a generous educational grant for each fellow.

The NHSBT published a strategic document entitled Taking Organ Transplantation to 2020 with the aim to enable the United Kingdom (UK) to match world-class performance in organ donation and transplantation [1].

Its goals were to increase the rate of deceased donors per million populations (pmp) from 19.1 to 26 pmp, increase organ utilisation rate by 5% - i.e. increase the donor heart and lung utilisation rate from the current 30% to 35%, and to increase the rate of deceased donor transplant rate from 49 pmp to 74 pmp.

Despite uncertainty and the reduction in transplant activity due to COVID-19 pandemic, these initiatives together with a greater use of Mechanical Circulatory Support Devices (MCSD) will inevitably result in an increase in heart and lung transplant activities and demand on the service over the next decade. Therefore training competent, highly specialized transplant surgeons has never been more essential. We assess the national surgical training scheme in cardiothoracic transplantation, its current perspectives and its vision for the future.

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Methods

In 2017 two independent surveys were conducted to assess the success of this national transplant Fellowship and to predict the workforce requirements to meet the demands in to 2020's. Firstly an electronic confidential trainee surveys of the national Fellows: In this survey we enquired about three aspects of their training: 1) Satisfaction with Fellowship; 2) Surgical experience in placement; 3) Mode of assessment. Then in late 2017 a workforce prediction survey of all the transplant centers in the United Kingdom (UK) was conducted. Outcomes were presented in numbers and percentages. Weighted average (arithmetic mean) was used to score for level of satisfaction with training. Comparisons were made graphically.

Results

There were nine recruits between 2009 and 2016, eight responded to the survey (89%). The recruitment was through competitive national selection. The shortlisted candidates were interviewed by a panel of transplant surgeons which included the chairs of the national Cardiothoracic Transplantation Advisory Group (CTAG). The majority of Fellows had completed general cardiothoracic training (equivalent to board certification) prior to taking up the Fellowship (n=6 out of 9). The average length of Fellowship was 15 (SD=3) months. The overall Satisfaction with the fellowship had a weighted average score of 7.13 out of 10.

All but one trainee were trained in both heart and lung transplantation and all but one recommended the Fellowship. Most thought the fellowship was adequately supervised, prepared them for a consultant position in transplantation all but one had secured a consultant position in the UK and 50% of them had achieved a substantive consultant post within 6 months of finishing the Fellowship.

Every trainee had a learning agreement with their assigned educational supervisor and participated in regular appraisals although split 50:50 between Deanery and the local hospital/trust. 60% of Fellows did not use standard forms of Work Based Assessment despite being in a "recognized training post". And the weighted average score for satisfaction with surgical exposure was 5.9 out of 10.

Figure 1 is a graphical illustration of surgical exposure by the trainees. It illustrates exposure to organ procurement, organ implantation, implantation of mechanical circulatory support and exposure to index cardiothoracic surgical procedures during their transplant training. Figure 2 illustrates the perceived proportion of training time spent in purely service provision and how often the trainees had to compete with others for theatre time (Figure 3). There were complementing written feed backs for a need to increase exposure to training in mechanical assist device implantation, need for reduction in service commitments, improve safe guarding of theatre slots and a need for oversight from other centers to ensure appropriate training and exposure.

There are currently 36 cardiopulmonary transplant surgeons in the UK. 4 are thoracic surgeons performing only lung transplantation.

The most recent survey of the transplant workforce indicates that 44% of the current Consultant Surgeons are aged over 50 years old and 14% over 55 years old. Only 6% are under 40. Most are job planned to spend 8 to 10 hours per week extra on this discipline alongside their routine and emergency commitments in general cardiothoracic surgery.

Despite the current reduction in transplant activity caused by COVID-19 pandemic, units report a likely recruitment need of at least 11 new Consultant posts by 2023. This however maintains the status quo and does not account for anticipated increases in activity that are likely through implementation of the new legislation on donation in England to "opt out" and the applications of new technologies to increase organ utilisation such as *ex-vivo* lung perfusion and heart donors after cardiac death. Furthermore there is a trend towards surgeons taking earlier retirement, moving units, going abroad or ceasing on call duties which will significantly impact upon the national workforce.

Discussion

In 2009 a new UK National Cardiothoracic Transplant training scheme was established to supply NHS transplant consultants to meet the UK's increasing demand in to 2020. This Fellowship offers a broad experience in all aspects of transplantation and mechanical circulatory support. We assessed the outcome of this Fellowship scheme in 2017 and determined the projected consultant workforce prediction up to 2023 to determine if the scheme can match demand of the future.

This survey showed that all but one peri CCT Fellow secured a consultant appointment. In fact half had secured a substantive (permanent) consultant position within 6 months of ending their fellowship. This is a significant achievement and testament that the fellowship had trained high quality transplant surgeons that were utilized nationally. This Fellowship had successfully addressed the national workforce deficit by training competent cardiothoracic transplant surgeons but we identified a need to improve access to perform mechanical circulatory support procedures and safeguarding operative opportunities for the fellows. Seven of the eight respondents recommended the Fellowship; one had a poor experience. The satisfaction with surgical exposure had a weighted average of only 5.9 (Scale 1-10). This partial dissatisfaction as illustrated in Figure 1 is mainly due to a lack of exposure to implantation of mechanical circulatory devices. The access to performing indexed cardiac or thoracic procedures was high, however all trainees thought they had to compete for access to theatre sessions (Figure 3).

We recognise that this survey is limited by the relatively small number of participants and centers providing training, however this is a highly specialized service which is poorly defined but of high valued. An extremely challenging super specialty which may be unattractive to some trainees due to it's out of our nature of work.

The next challenge is in standardizing training, assessment and the appraisal process for the trainees. Sixty percent of Fellows did not use the standard forms of Work Based Assessment that they were used to during their general cardiothoracic surgery despite still being in a "recognized training post". Those who continued using Intercollegiate Surgical Curriculum Programme (ISCP) as a professional portfolio found it challenging as it was not designed to incorporate super speciality training procedures not to mention its annual cost.

There were issues around direct responsibility and ownership for training these Fellows. The deanery who recruited these trainees expected the local deanery to perform the appraisals but there was lack of collaboration between the deaneries and a lack of clarity of responsibility. All trainees however had adequate supervision and appraisals.

There are 36 cardiopulmonary transplant surgeons in the UK. 44% are aged over 50 years. In the short term; units themselves report

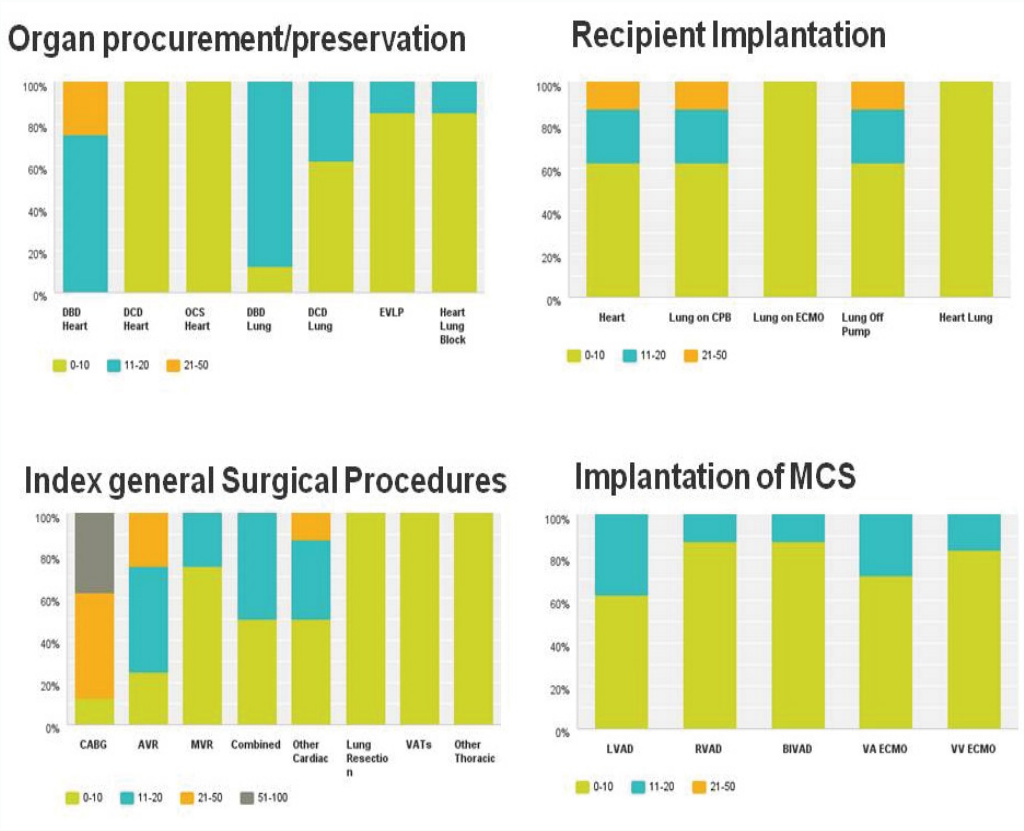

Figure 1: (a) Organ Procurement/Preservation (b) Recipient Implantation (C) Index General Surgical Procedures (d) Implantation of MCS.

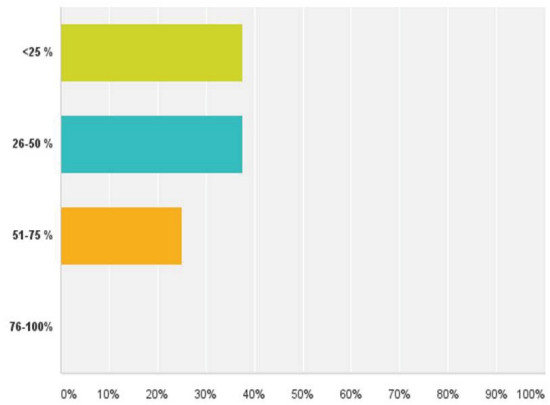

Figure 2: Proportion of Work Perceived as purely Service Provision.

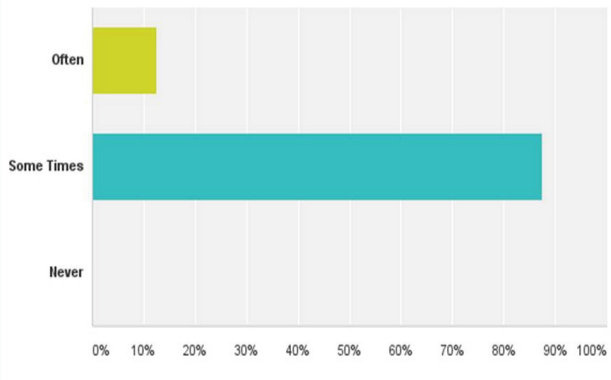

Figure 3: Competition for Theatre Exposure.

a likely recruitment need of 11 new posts until 2023. This however maintains the status quo and does not account for the long anticipated increases in activity. With a predicted retirement age of 60 there will be the need for substantial consultant recruitment to the discipline from 2023 onwards which will outstrip the ability of the current Fellowship scheme to deliver new surgeons. It takes as much as 18 months to train each surgeon in this super speciality.

As a result of this survey the national training in cardiothoracic transplantation is going through major revision. The number of trainees and the units providing training will increase. Thoracic surgeons are being encouraged to participate in this programme. There will be better accountability and organizational structure within the cardiothoracic society by introduction of a transplant education lead. New technologies for training and assessment of cardiothoracic transplant surgeons will be considered using computerized method of objective assessment of surgeon's technical abilities [2]. This in future will complement the current subjective training and assessment by direct interaction with the expert trainer.

Conclusion

We are still anticipating a major increase in the number of heart and lung transplantation and the use of MCS in the next decade. There will also be a need to catch up with national transplant activity

following COVID-19 pandemic. The need for trained cardiothoracic transplant consultants is therefore likely to increase. The UK national cardiothoracic transplant training scheme has so far successfully addressed the national workforce deficit by training competent cardiothoracic transplant surgeons. This scheme has high acceptability amongst trainees. However major changes are on the horizon. Changes in the way we train and assess super speciality training in cardiothoracic transplantation using innovative computerized technology with objective and structured methods.

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Contributor Ship

Espeed Khoshbin-Conducted the trainee online survey analyzed the data and wrote the manuscript. Stephen Clark-Conducted the survey of the transplant directors analyzed the data and contributed to the review of the manuscript.

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