PET/CT: Service Provision and Understanding Patients’ Needs

Being involved in some upsetting clinical cases is, sadly, a frequent aspect of a PET/CT practitioner’s job. Numerous times I found myself reflecting, at the end of the working day, on the patients I had encountered – the following are examples of such experiences.

A 21-year-old male patient with testicular cancer was assessed via a PET/CT scan following chemotherapy treatment. Unfortunately, the outcome wasn’t favourable for the patient and, because he wasn’t told the result on the day of the scan, I found myself in possession of this vital information but unable to pass it on, which can be upsetting.

Despite this, I was still able to empathise with him, using the emotional intelligence reflective method. The experience of dealing with the patient involved observing his personal mental state, appreciating the treatment that he had already received, and acknowledging his expectations/fears/anxieties of what lay ahead.

Suddenly I found myself completely outside my comfort zone, on the ’front line’ with patients, some of whom (I would later discover during the nine month clinical placement) were in different phases of dealing with the initial shock of receiving upsetting news from clinicians or were living in hope that subsequent treatment had been successful. It was almost as if my role had become one of a modern day ’gate keeper’, who appeared (from a patient’s perspective) to hold the key to future survival. It must have been totally distressing for patients who were undergoing PET/CT scans, especially those who did not have any support in the form of relatives or partners.

When things go wrong

Fortunately, the problem of a PET/CT scanner going ’hard down’ after the quality control checks had been performed happened infrequently, but on the occasions that it did, patients booked were not able to be scanned. There are a number of factors to be considered when this happens and initially I had very little self awareness of the ramifications. Firstly, there is the inconvenience to the patients, in terms of mental preparation and the fact that a fasting procedure has been followed prior to the scan. Secondly, there is the knock-on effect on subsequent treatment – for many patients, there is a one week turnaround time between having their scan and undergoing subsequent treatment/changes in overall management. Thirdly, the patients’ disappointment can be potentially devastating.

Telling patients that the scanner wasn’t working engendered a feeling of disappointment and almost defeat. Some patients broke down in tears, because this was probably the final piece of bad luck they just didn’t want to hear. The physiological and psychological build up to a PET/CT scan may vary between patients, but most are tense and anxious because the results can potentially change their overall life expectancy.

This experience left me with a personal sense of failure to provide a clinical service for a set number of patients. This feeling was shared by my colleague and it must have an impact upon the overall well-being of practitioners who work in this environment. I am conscious to explore the value of having counselling support for people who work within the field of oncology.

The acceptance of PET/CT within the treatment algorithms of diseases such as colorectal cancer, lymphoma and lung cancer is evident within the NICE treatment guidelines. However, some primary care trusts (PCTs) in England are still experiencing problems in obtaining funding for some patients to access PET/CT facilities. This was evident at one hospital site, where a patient who wasn’t particularly healthy and had some difficulty breathing, was referred with a query of a solitary lung lesion. The PET/CT scan was positive and I was left with a feeling of inequality, because, due to funding issues, this patient had to travel a considerable distance in order to gain access to treatment which was readily available within his own region.

However, this experience provided a stepping board in beginning to understand the potential...
inequalities which may exist, and the ‘postcode lottery’ of healthcare within the UK. Although I had taught health policies within the undergraduate programme at the university where I work, this was the first time I had witnessed it in clinical practice. I experienced Mulligan’s theory of pure feeling and reflective emotion, rather than reasoning, as I stood opposite this elderly gentleman on the imaging bed, post-scan, trying to catch his breath and saying ‘thank you’ for scanning him.

This patient also had problems breathing steadily during the scan and emerging technology in the form of respiratory gating hardware (figure 1) and software is beginning to have a role in the examination of patients with respiratory related diseases. Respiratory gating is an emerging area of clinical PET practice, but has been established within radiotherapy for a number of years. Nehmeh et al demonstrated the efficacy of employing a form of respiratory gating with lung cancer patients during PET/CT scanning procedures, allowing for greater accuracy in localising the lesion volume and subsequent radiotherapy planning. However, employing this hardware increases the overall scanning time of PET patients and requires set-up time before it can be utilised. I was fortunate enough to witness the use of respiratory hardware and software at a clinical site, even though it was still in the trial stages of being routinely used.

Understanding patients
Using Gibbs’ model of personal reflection, adapted through Atkins and Murphy, I was able to relate to personal experiences throughout the day. Recording such information in a diary format was difficult at times and sometimes this had to be conducted at the end of a long working day. However, I was beginning to use this model of learning to reflect upon new experiences/situations that were presenting themselves. Along with the ability to tune emotions into a meaningful learning experience, I suddenly found myself being able to provide a greater level of holistic care for the patients.

Claustrophobic patients present themselves in many ways within the clinical environment and one event stands out in particular. Although the usual pre-checks had been undertaken with this patient prior to his PET/CT examination, it wasn’t until he was transferred to the actual scanner room (after having the routine one hour post injection uptake period time in the injection room (figure 2)) that the patient stated he was claustrophobic. Although I had read his medical notes and evaluated the findings from previous CT and MRI scans, I had not considered the fact that he may not have felt comfortable in discussing his claustrophobia issues with me.

Previous scans had been conducted with the use of sedation and/or valium, which may be prescribed for PET/CT patients. It acts as a muscle relaxant for those who are nervous, thus preventing the appearance of ‘brown fat uptake’, which may be mistaken as false uptake of FDG-18 tracer. Valium is also prescribed for patients where a malignancy is suspected in the laryngeal region.

Unfortunately, the claustrophobia proved too much and the patient was unable to be scanned. A clinical incident form had to be completed, because he had received an administration of a radioactive solution and the calculated risk would be undertaken. I felt responsible for the patient’s overall wellbeing whilst in my care. Perhaps I should have enquired more about his overall feelings and body language and, after discussions with colleagues, I felt the need to research anxiety and how it presents itself within patients.

This was a worthwhile exercise and future patients who demonstrated slight anxiety were quickly identified and I made a point of showing most patients the PET/CT scanner environment before their briefing/injection procedure was undertaken. According to Moon, the way in which people learn from experience is a valuable one and also relates to the emotional development of a character, which is also supported by Donaldson.

Value and versatility
One of the most powerful demonstrations of the value of clinical PET/CT came in the form of a patient’s response to chemotherapy for non-Hodgkin’s lymphoma. This particular patient had previously been diagnosed with cervical and mediastinal lymph involvement of non-Hodgkin’s lymphoma (figure 3, overleaf). Subsequent cycles of aggressive chemotherapy treatment were undertaken and the patient was referred for a follow-up PET/CT approximately three months later. The results were astonishing, with complete remission of the lymphoma (figure 4, overleaf).

Throughout the nine month placement, the number of patients being referred for malignant pleural mesothelioma (figure 5, overleaf) appeared to increase. This is a rare form of cancer, arising from the mesothelial cells, and PET is becoming a useful diagnostic tool in the initial diagnosis and management of patients. Excessive contact with asbestos...
is considered one of the influential factors associated with this disease and PET/CT has the ability to provide additional information relating to potential lymphatic involvement, tumour invasion into the lung and thoracic wall and response to treatment. The versatility of PET imaging to help guide clinicians with the overall staging and management of oncology patients is still emerging and the development of additional tracers, such as Fluorine-18, is providing greater evidence of the potential of this imaging modality.

Conclusion
I undertook the PET/CT placement around the time that my father sadly passed away from a lung related disease, and the whole context of the diagnostic value and availability of PET/CT became apparent – it has the potential to change the entire diagnostic and treatment algorithms of oncology patients within the UK. Sadly, the initial PET/CT consultation document has yet to provide a true ‘hub and spoke’ provision mechanism, but the second phase of the national PET tender will hopefully open up services to more patients.

I also realised that there is limited formal/accredited training (outside the in-house training provided by Alliance Medical Ltd (AML) and short study days) for PET/CT practitioners in the UK, in comparison to other countries, such as Australia. Informal discussions with clinical colleagues highlighted the fundamental requirements for practitioners, and these suggestions were formalised into a draft syllabus. A collaborative working relationship with AML has been established, whereby the provision of a 90 credit hybrid imaging module is now available from the University of the West of England, Bristol.

Overall this was a positive experience, which at times left me feeling completely privileged to be at the front line, working with experienced PET/CT practitioners who, above everything else, were compassionate about the service they provided. To say this experience has changed my outlook on the clinical value of PET/CT is an understatement.

About the Author
Marc Griffiths is subject group leader for radiography and nuclear medicine programme leader at the Faculty of Health and Life Sciences, University of the West of England, Bristol.

Acknowledgements
I am very grateful for the training received during the clinical PET/CT placement by my colleagues. Gaining practical experience is essential to the development of any clinical skills and the knowledge, understanding and problem solving abilities gained during this time will be embedded within future educational curriculum. Particular gratitude is expressed to Barbara Ruby, Leticia Burton, Ian Niel, Olivia Thornton, and Lauren Dorn.

Thanks also to Zoe Lingham for proof reading this article and providing feedback on the overall content.

All images have, where relevant, been obtained with the permission of AML or through patient consent.