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Reducing harm from radiotherapy

Healthcare systems should follow the lead developed in other high risk industries.

Like most treatments, radiotherapy has the power to heal but also to harm. (1 Our Article) Worldwide, around 10 million people are diagnosed with cancer each year and 40-50% will receive radiotherapy. In the UK, around 200 linear accelerators deliver 100 000 courses of radiotherapy in 1.5 million fractions annually; this results in roughly 4.25 million doses of radiation for cancer treatment each year (data from the HPA and the National Cancer Services Analysis Team).

Because of the hazardous nature of radiation, an extensive framework of protocols, standards, and legislation is in place to protect patients and healthcare workers.

The WHO Alliance for Pt Safety has this year taken up the challenge of making radiotherapy safer (www.who.int/patientsafety/en). It will deal with two key questions. Firstly, can standardised safety interventions be developed that reliably and consistently reduce the risk of patients being harmed by radiotherapy? Secondly, can lessons from previous errors be rapidly translated into safer health care for patients everywhere?

Despite global efforts to minimise harm from radiotherapy, cases where patients have been harmed in apparently similar circumstances are reported. This is corrosive to public trust and confidence in services and undermines the credibility of professionals who provide health care.

In 2004, at Cookridge Hospital, West Yorkshire, a woman was prescribed 15 radiotherapy treatments for breast cancer. A crucial error was made before delivery of the first treatment, and this error was repeated for 14 treatments. This resulted in the patient receiving a higher dose of radiation than was intended, with a cumulative overdose of 2.5 times the amount prescribed. Computerised parameters had been mixed up, so that an essential treatment factor was omitted. The patient survived but her life expectancy may have been shortened. (7)

In 2006, at the Beatson Oncology Centre in Glasgow, a teenager received 19 radiotherapy treatments for a brain tumour. At the end of these treatments it was realised that a manual calculation needed to be applied after the computer provided the treatment plan. This occurred at a time when new technology was being introduced.

In 1991 at North Staffordshire Royal Infirmary it was discovered that 1000 cancer patients had received incorrect doses of radiotherapy for nearly 10 years. When new computers were introduced in 1982 for certain cancer treatments, the comprehensive nature of the system had not been fully realised. Consequently, a manual adjustment was erroneously and repetitively made to the data, changing the dose of radiation delivered. (9) The error only came to light when technology was being updated a decade later.

On top of these well documented incidents, the NHSLA has reported around 150 negligence claims for radiation damage over about 30 years.

So how can we learn from these instances and what are the challenges ahead? The first major challenge is to implement new technology effectively. Technology that allows computers to be used for cancer treatments is welcome as it avoids the need for complex manual calculations. However, new technologies can be poorly implemented because staff are inadequately trained. This may introduce a whole new set of risks to patients.

The second challenge is to prevent harm to patients. Current concepts of patient safety recognise that human error is inevitable; however, harm to patients is not. Organisations need to have robust mechanisms for detecting errors quickly to ensure that patients are not harmed. Standard operating procedures are a key element of most high risk industries, such as aviation, but hardly feature in health care.

In the clinical incidents described, these defence barriers were ineffective or non-existent. Not only did errors turn into harm, the same error occurred repeatedly, affecting other patients.

The third is to put safety at the core of healthcare delivery. An organisational culture that promotes safety has distinct and consistent characteristics. These include effective organisational leadership, well designed systems and processes of care, and competent healthcare staff. Such characteristics are vital for ensuring the safety of patients. Recognising the problem is a starting point, yet finding the solution is a challenge. There are many examples worldwide of organisations and best practices from which we can learn. (10) The UK needs to have an important role in this work. This will involve analysing information from all major radiotherapy accidents worldwide, identifying common causes, designing standard operating procedures that staff can use, and measuring progress by reduction in harm to patients. LD, CMO

40-50% of 10 million = 4-5 million

1% of 4-5 million = 40 - 50,000 people suffering some sort of damage