



Contents lists available at ScienceDirect

Clinical Oncology

journal homepage: www.clinicaloncologyonline.net

Overview

Medical Physics Challenges for the Implementation of Quality Assurance Programmes in Radiation Oncology

A. Meghzifene

International Atomic Energy Agency, Vienna, Austria

Received 3 October 2016; received in revised form 13 October 2016; accepted 17 October 2016

Abstract

The importance of quality assurance in radiation therapy, as well as its positive consequences on patient treatment outcome, is well known to radiation therapy professionals. In low- and middle-income countries, the implementation of quality assurance in radiation therapy is especially challenging, due to a lack of staff training, a lack of national guidelines, a lack of quality assurance equipment and high patient daily throughput. According to the International Atomic Energy Agency (IAEA) Directory of Radiotherapy Centres, the proportion of linear accelerators compared with Co-60 machines has increased significantly in recent years in low- and middle-income countries. However, this increase in the proportion of relatively more demanding technology is not always accompanied with the necessary investment in staff training and quality assurance. The IAEA provides supports to low- and middle-income countries to develop and strengthen quality assurance programmes at institutional and national level. It also provides guidance, through its publications, on quality assurance and supports implementation of comprehensive clinical audits to identify gaps and makes recommendations for quality improvement in radiation therapy. The new AAPM TG100 report suggests a new approach to quality management in radiation therapy. If implemented, it will lead to improved cost-effectiveness of radiation therapy in all income settings. Low- and middle-income countries could greatly benefit from this new approach as it will help direct their scarce resources to areas where they can produce the optimum impact on patient care, without compromising patient safety.

© 2016 Published by Elsevier Ltd on behalf of The Royal College of Radiologists.

Key words: Challenges; IAEA; low- and middle-income countries; quality assurance

Statement of Search Strategies Used and Sources of Information

This paper reflects the author's opinions on quality assurance in radiation oncology.

Introduction

A recent study [1] addressing the specific link between quality and predicted outcomes in radiotherapy found that in nearly half of multicentre co-operative group trials, clinical failure rates were significantly higher after inadequate versus adequate radiotherapy. This conclusion is not a surprise to the radiation oncology community; it simply

shows once again that quality leads to improved outcomes and gives supportive arguments for the professionals to request specific resources dedicated to quality assurance.

Ideally, all imaging and treatment modalities should be subject to quality assurance. However, new treatment modalities are sometimes introduced into clinical practice without a dedicated quality assurance programme. Over the last three decades, several reports have been published on quality assurance, including guidelines on specific quality assurance procedures for various radiotherapy modalities. For example, the International Atomic Energy Agency (IAEA) has published guidelines on quality assurance in radiotherapy [2] as well as on peer reviews of radiation therapy practice [3] to identify gaps in documentation and actual practice; and to make recommendations for quality improvement.

The implementation of quality assurance in clinical environments is always challenging, due to the need to take up machine and staff time for what is considered, by some

Author for correspondence: A. Meghzifene, International Atomic Energy Agency, PO Box 100, 1400 Vienna, Austria. Tel: +43-1-2600-21653.

E-mail address: a.meghzifene@iaea.org

<http://dx.doi.org/10.1016/j.clon.2016.10.008>

0936-6555/© 2016 Published by Elsevier Ltd on behalf of The Royal College of Radiologists.

managers, as non-productive work. In low- and middle-income countries (LMICs), this issue is further exacerbated by severe resource constraints, especially for equipment maintenance, acquisition of quality assurance equipment and consumables, and support for the continuous professional development of staff. Many countries are able to make capital investment for the purchase of major radiotherapy equipment. However, only a small fraction of countries are able to secure an operational budget that allows sustaining radiotherapy.

The purpose of this article is to present the author's perspective on the main challenges faced by radiation therapy teams in the development and implementation of quality assurance programmes in hospitals. It also includes a brief overview of the IAEA's initiatives to support quality assurance in radiation therapy in LMICs.

Radiotherapy Infrastructure in Low- and Middle-income Countries

Since 1959, the IAEA has maintained the Directory of Radiotherapy Centres (DIRAC) [4]. The directory is continuously updated, based on replies to questionnaires circulated by the IAEA among its member states. It includes data on teletherapy machines, brachytherapy units, sources and devices used for dosimetry, patient dose calculation and quality assurance. Apart from DIRAC, only a few reports describe national radiotherapy capacity. Currently DIRAC includes almost 8000 radiotherapy centres operating about 13 500 teletherapy and 2450 brachytherapy machines for 7.4 billion people. These numbers suggest that on average, each teletherapy machine serves about 550 000 people. In high-income countries one teletherapy machine is available for every 120 000 people, whereas in low-income countries, one machine serves on average 2.5 million people. However, the actual number of fully functional radiotherapy machines is much lower in many LMICs due to age, quality of machines and poor maintenance services. There has been an increase in the overall number of radiotherapy machines during the last 12 years, from about 7000 in 2006 to 13 000 in 2016. Specifically, the proportion of linear accelerators (linacs) compared with Co-60 machines has increased significantly from about 66% to about 83%. This increase in the proportion of linacs reflects a clear trend of replacement of Co-60 machines with linacs in many LMICs. However, the necessary investment in staff training and quality assurance is often lacking. The IAEA has published technical guidelines in radiotherapy aiming at providing relevant information to the member states to take informed decisions on new technologies, taking into account their national priorities and their resources [5,6]. The decision to invest in a new advanced radiotherapy technology or in other basic health care facilities is the sole responsibility of each country. However, it is important for the decision makers to have a full understanding of all requirements of new technologies, including quality assurance, to ensure sustainability of the radiation therapy services in a cost-effective manner.

Sustaining Quality Radiotherapy Services in Low- and Middle-income Countries

The IAEA has a long experience in supporting LMICs to establish or expand radiotherapy services [7]. Working with highly motivated radiation oncologists and medical physicist professionals who are fully committed to establish a radiotherapy clinic in a country is absolutely essential, but not sufficient. Through this experience, the IAEA understands that it is essential to ensure the support and commitment of national authorities for the successful installation and long-term sustainability of radiation therapy services. This is the main reason why national projects are supported by the IAEA only when they are endorsed by national authorities. The establishment of a first radiation therapy centre with the support of the IAEA has often led to further expansions and the establishment of additional radiation therapy centres. Therefore, it is essential that project counterparts are fully involved in the entire process of planning, design, construction, equipment installation and commissioning. The duration of the entire process will probably be longer, compared with turn-key solutions; however, the project counterpart team would acquire know-how that can be used for new projects on setting up or expanding radiotherapy services in the country. Quality is vital in radiotherapy and has to be integrated into project planning and implementation, in addition to clinical, medical physics and radiation safety aspects during routine treatment. Not only does quality assurance prevent errors and gives high confidence that patients will receive the prescribed treatment correctly, but quality also leads to cost-effectiveness [1]. In other words, a lack of quality usually leads to added costs.

Challenges and Lessons Learned

The importance of quality assurance in radiation therapy as well as its potential consequences on patient treatment is well known to all radiation therapy professionals. However, those working in LMICs face serious challenges for the implementation of quality assurance in their clinics. The most important challenges are probably due to the lack of education and training of some key personnel, structured and standardised quality assurance processes and procedures, and lack of resources (equipment and staff time) specifically dedicated to quality assurance.

Education and Training

The lack of specialised training of some team members, such as medical physicists and therapy radiographers, as well as their continuous professional development, is well recognised. The root causes can be diverse and vary from country to country, but the lack of national accredited programmes in these specialised disciplines, as well as the lack of certification of individuals, plays a critical role. In addition, the professional recognition of the medical physics profession remains a concern in many countries [8]. For

Download English Version:

<https://daneshyari.com/en/article/5698193>

Download Persian Version:

<https://daneshyari.com/article/5698193>

[Daneshyari.com](https://daneshyari.com)