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Review

Challenges of Radiation Oncology in Spain Today

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ABSTRACT

The increasing cost of health care delivery, coupled with reduced investments and budget cuts in European health care systems, has had a severe negative impact on health care delivery in Spain. This reduction in spending has had particularly negative effects on specialties that are heavily reliant on large capital investments to purchase the latest technologies needed to deliver optimal radiotherapy treatments. The Spanish Society of Radiation Oncology has been proactively working to mitigate the negative impact of budget cuts in Spain. In this paper, the authors describe a variety of solutions and proposals to overcome these challenges.

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1. Introduction

In recent years, health care costs have been rising steadily in lockstep with the increasing burden of cancer [1]. Although a large portion of this increased expense is mostly attributable to a greater prevalence of cancer in the population due to demographic and lifestyle factors[2], the role of accelerating technological change cannot be understated[3,4]. This situation is particularly problematic given the simultaneous decrease in tax revenues caused by the current economic crisis. The combined effect of rising costs and decreased government spending has had a devastating impact on health care delivery around Europe[5].

The Spanish health care system is among those countries hardest-hit by the crisis and investment in health care has

been reduced dramatically[6]. The impact has been especially notable on specialties such as Radiation Oncology that depend on heavy capital investments in costly equipment such as linear accelerators and modern imaging scanners[7].

Despite the difficulties posed by the current financial problems, these challenges are not insurmountable. However, what is needed is a re-thinking of priorities and, perhaps even a radical new approach to how radiotherapy services are paid for. In the present article, we describe some of the most important challenges in Radiation Oncology in Spain and suggest some innovative solutions to overcoming these challenges.

1.1. Organization of cancer care in Spain

Health care in Spain is organised as a National Health System (NHS)[8], with universal, free coverage for all Spanish citizens.

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However, implementation is not uniform, as each of the country's 17 autonomous regions controls many aspects of health care delivery in their respective regions. Importantly for this discussion, health care funding is allocated from the central government, and reductions in the NHS budget affect all 17 regions[8].

Infrastructure and Staffing

1.2. Infrastructure

According to the International Atomic Energy Association (IAEA), the recommended equipment coverage for radiotherapy is 6 megavoltage (MV) units per million inhabitants. With a population of 45 million inhabitants, Spain needs approximately 280 MV units. Currently, there are 250 MV units in Spain, 45 of which are more than 10 years old, and 22 of which are cobalt 60 machines. Thus, approximately one-third of the total MV units in Spain need to be replaced[9].

This equipment replacement, which will undoubtedly require a heavy investment, should be viewed from at least two perspectives. First, replacement units are needed to offer patients the best treatment to improve survival while decreasing toxicity and other adverse effects. There is little doubt that replacing outdated linear accelerators (linacs) will improve outcomes and thereby reduce the costs associated with suboptimal treatments (e.g., toxicity, hospitalization, medications, re-treatment, etc.). In addition, more advanced equipment would allow us to reduce treatment times, as radiotherapy can be delivered faster and more efficiently with modern linacs. This, in turn, would have a positive impact on overall savings, and there are clear examples in Europe that demonstrate this[10,11]. For example, the National Institute of Health in the United Kingdom estimated that 53% of the total cost of cancer care in 2010 was attributable to indirect mortality costs, with 8% related to indirect morbidity costs. These figures suggest that improvements in treatments and outcomes will ultimately result in both direct and indirect cost reductions[12].

However, because the investment required is so great, we believe that it is essential to develop a national plan to establish a defined time to renovate equipment on a rational basis. If such a plan is not developed, we may find ourselves—perhaps even within a relative short time (3–5 years)—in an extremely unfortunate situation as radiotherapy equipment around the country becomes woefully outdated. It is not difficult to imagine the difficulties of attempting to replace 100 radiation units for external beam radiotherapy in a short period of time. However, this is very likely to occur if we do not push for a reasonable plan now.

1.2.1. Rethinking how we pay for radiotherapy

In most of the world, the present model of radiotherapy delivery involves the purchase of equipment from manufacturers or distributors. When these machines become outdated, they are replaced by newer machines. However, this approach is expensive, particularly because technological change is occurring so rapidly that even the latest equipment will be obsolete within a few years. We suggest two possible solutions to this problem.

One simple change would be to avoid purchasing equipment that is not upgradeable. While some accelerators (e.g., RapidArc on Varian Trilogy) can be upgraded relatively easily, this is not always the case. For this reason, it is important to consider the upgrade possibilities carefully before purchase. Moreover, even when upgrades are possible, there inevitably comes a time when older machines become outdated and must be replaced.

Given this problem of rapid obsolescence, we suggest that health authorities need to consider a more radical alternative to the traditional economic model described above. Instead of purchasing machines outright, it might make more sense to pay on per-treatment basis: that is, each radiotherapy session or service would have a pre-defined cost paid directly to the service provider. In this model, the radiotherapy equipment provider (the manufacturer or specialised provider) would be responsible for purchasing, maintaining, and replacing the equipment. While such a change would represent a paradigm shift that would require a great deal of study and discussion before it could be implemented, we believe strongly that new ideas and approaches are urgently needed. Clearly, such a far-reaching change would require the cooperation of all parties involved—industry, government, hospitals, and health care professionals—and this will not be easy to obtain.

Short of achieving the aforementioned paradigm shift in how radiotherapy is paid for, another obvious approach is to focus on improving treatment processes—in other words, in streamlining and increasing efficiency to avoid waste, minimize errors, and improve outcomes[13]. Certainly, in this sense, the use of modern, up-to-date technology would be enormously helpful. However, the approach has to be multi-dimensional and include all aspects of cancer care delivery. If properly implemented, a focus on improving quality and efficiency would surely result in better care and outcomes, fewer treatment-related complications, and greater efficiency and savings[14].

1.3. Staffing

Another cost-related concern involves human resources. The increasing prevalence of cancer, coupled with the growing number of indications for radiotherapy (stereotactic body radiotherapy [SBRT] for inoperable lung cancer is a good example) has stimulated the demand for new specialists. At present, there is a deficit in the number of Radiation Oncology specialists at the national level. Currently, the mean number of specialists per million inhabitants in Spain is approximately 11.5, a figure that is far below the ratio (20 specialists/million) recommended by the Spanish Society for Radiation Oncology (SEOR). These figures imply that, as a whole, Spain is understaffed by 300 to 350 specialists. Moreover, the distribution of these specialists among the 17 autonomous communities of Spain is highly uneven.

Unfortunately, current economic conditions and severe budget restrictions limit the ability to hire new specialists. As a result, this care deficit is remedied in an *ad hoc* manner, with many Radiation Oncologists working overtime without extra compensation. However, this situation is not sustainable. The obvious solution is to train and hire more specialists, although this may not be possible in the short term. Another solution

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