Cost-effectiveness data to guide treatment decisions for elderly patients: focus on radiotherapy

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Symposium: Elderly: Health economics

SP-0243
Cost-effectiveness data to guide treatment decisions for elderly patients: focus on radiotherapy
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As a disease of the elderly, cancer poses a unique public health problem worldwide. Elderly patients with cancer are less likely to receive guideline-based treatment and/or participate in clinical trials. At the individual patient level, competing risk, perceived efficacy of treatment, and various levels of patient/physician preferences all contribute to heterogeneity in treatment decision-making. At the population level, the economic impact of this variability is significant. Costs incurred in the prevention, diagnosis, treatment and surveillance of cancer are rising at a rate disproportionate to what healthcare systems are able to afford. Cost-effectiveness research can be employed to determine the suitability of radiotherapy in elderly cancer populations through modeling or in the context of clinical trials. Using stereotactic radiotherapy in early stage lung cancer as an example, the principals of cost-effectiveness research will be explored. Concepts such as cost calculations, quality adjusted life expectancy, utilities, and incremental cost effectiveness ratios will be introduced.

SP-0244
From co-morbidity and toxicity to quality of life: A black hole in economic evaluations of radiotherapy?
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Cancer is increasingly becoming a disease affecting the lives of the elderly, especially in more developed countries. Over the last 30 years, many patients have experienced the mortality lowering benefits of earlier diagnosis and more effective treatments. At the same time, the elderly population is demographically fast increasing, pronouncing even higher prevalence and incidence rates in the near future. Among other co-morbidities, second or third cancers are not an exception any more. Because of large individual variations in physical and mental conditions and personal preference of the patient and/or family, the treatment decisions seem difficult to fit into guidelines. Inclusion in clinical trials is rare. Overall, elderly receive (adjuvant) radiotherapy and chemotherapy less often, probably because of fear for higher rate of complications. In clinical surveys, however, elderly don’t suffer from more complications than younger patients, except for cardiac complications and postoperative death. For most tumours relative survival is lower for the elderly, except for patients with colon cancer, prostate cancer or indolent NHL. Co-morbidity seems to have an independent prognostic effect, except for tumours with a very poor prognosis.

Alternative research strategies need to be sought to improve insights on causes of death in this population. Special attention is needed for the economical impact of over- versus under treatment. Both palliative care and complications generate high costs, but reports on costs are rare. Often quality of life surveys are lacking late outcome and decision-making trade offs. Registry based surveys can help insights in population-based decision-making, but are lacking co-morbidity and toxicity data. Guidelines are needed to reduce over-treatment but also under-treatment, taking into account life-expectancy and co-morbidities in all our cancer patients.

SP-0245
Is it time to design specific radiotherapy trials for the elderly, and how can we integrate the economic perspective?
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More than 60% of cancer patients is older than 65 years, a figure that only will increase the coming decades. As elderly patients are underrepresented in clinical trials, treatment recommendations for the general population cannot straightforwardly be extrapolated to the elderly. It is anticipated that intensified treatment regimens are less effective in elderly due to physiologic changes occurring with aging. Furthermore, higher toxicity rates are expected given the high rates of comorbidities and generally poorer performance status. Hence, the balance between the benefits and risks of a treatment will be different for this patient group. In fact, this balance will be different for each individual elderly patient: although it is reasonable to spare the patient with severe comorbidities or a bad performance status an intensive treatment from which he is unlikely to benefit and that might even decrease quality of life (QoL), the one that is medically fit may benefit from such an intensive treatment. Furthermore, given the limited life expectancy, QoL and preservation of independence and cognition are important to take into account.

For these reasons, there is an urgent need to design clinical trials specific for the elderly, build evidence to guide treatment selection in this group and implement it in clinical practice. First, reliable tools are needed to distinguish the subgroup of fit patients from frail patients, i.e. those expected to experience important toxicity. Until now, this decision is rather subjective as it is based primarily on the physician’s perception whether a patient is deemed fit enough to undergo a certain treatment. Geriatric assessments have shown to be more predictive for survival, dependency and toxicities than age or performance status in elderly treated with chemotherapy (Freyer, Ann Oncol 2005; Hurria, JCO 2011; Maione JCO 2005), but these have not been validated for radiotherapy. The fact that a full geriatric assessment is time consuming and is not always reimbursed makes it difficult to implement in routine clinical practice. Therefore, the EORTC recommends a minimum dataset data (MinDS) to be collected, which takes max 5 minutes to complete (Pallis, Ann Oncol 2011). It is anticipated that this
dataset will evolve over time as more data become available. Secondly, “classical” trial end points such as overall and progression free survival may not be the most appropriate outcome measures in elderly-specific trials. Given the limited life expectancy, QoL is essential to take into account, and also, cost-effectiveness will be different from the general population. This makes quality adjusted survival, measured in quality adjusted life years (QALYs), a more suitable end point, allowing the answer to both questions: it reflects both the quantity of lifetime gained and the value of this time, and it provides a direct outcome measure to calculate the cost-effectiveness of the treatment. In order to calculate QALYs, utility scores should be collected prospectively. The EuroQol 5 Dimensions (EQ-5D), a short questionnaire consisting of five questions, is most frequently used for this purpose. General and disease specific quality of life, toxicity and preservation of functional capacity are interesting secondary end points, scored with a uniform and internationally acknowledged scoring system. The additional use of the elderly specific questionnaire EORTC QLQ-ELD15 is recommended, which has recently been validated internationally (Wheelwright, Br J Cancer 2013).

Results from surveys indicate that the large majority of elderly patients would be willing to participate in trials (Comis, JCO 2003; Townsley BMC Cancer 2006), but care should be taken to limit the complexity of the trial design and burden of study related examinations.

Purpose/Objective: Proffered Papers: Physics 5: New technology and its clinical implementation

OC-0246 Clinical implementation of online MR-guided adaptive radiotherapy for abdominopelvic malignancies

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Materials and Methods: The first clinically deployed online adaptive MR-IGRT system consists of a split 0.35T MR scanner straddling a ring gantry with three MLC-equipped 60Co heads. The unit is supported by a fast Monte Carlo based treatment planning system allowing real-time adaptive planning with the patient on the table. All patients undergo CT- and MR-simulation for initial treatment planning. A high-resolution volumetric MR image is acquired for each patient at the time of daily treatment setup. Deformable registration is performed using the original simulation CT dataset from initial treatment planning, which allows the transfer of the initial contours and the electron density map to the localization MR of the day. The deformed electron density map is then used to recalculate the original plan on the anatomy of the day for physician evaluation. Physician re-contouring and plan re-optimization are performed when required, and patient-specific quality assurance is performed using an independent Monte Carlo calculation for online adaptive QA. The tool also allows for verification of plan parameters against the original plan.

Results: Online adaptive MR-IGRT was implemented in September of 2014. Five patients with abdominopelvic malignancies have been treated with planned evaluation for treatment adaptation in the first 2 months. The clinical setting included neoadjuvant rectosigmoid (n=3), unresectable gastric, and unresectable pheochromocytoma. MR localization images were used to recalculate dose online for all cases. Re-contouring and re-optimization was deemed necessary for 3/5, while the initial plan deemed sufficient for 2/5 cases. Reasons for plan adaptation included change in target size, weight loss, and change in small bowel anatomy. The approximate times required for online dose calculation, re-contouring, re-optimization, and QA were 2, 15, 2, and 5 minutes, respectively. Treatment utilizing the online adaptive plan was completed successfully for all cases when deemed necessary.

Conclusions: Online adaptive MR-IGRT has been successfully implemented with planning and QA workflow suitable for routine clinical application. Clinical trials are in development to formally evaluate adaptive treatment of bladder, pancreatic, and oligometastatic abdominal malignancies.

Treatment Adaptation (Tumor Response)