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Original Article

Implementing Head and Neck Contouring Peer Review without Pathway Delay: The On-demand Approach

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Abstract

Aims: Peer review of contour volume is a priority in the radiotherapy treatment quality assurance process for head and neck cancer. It is essential that incorporation of peer review activity does not introduce additional delays. An on-demand peer review process was piloted to assess the feasibility and efficiency of this approach, as compared with a historic scheduled weekly approach.

Materials and methods: Between November 2016 and April 2017 four head and neck clinicians in one centre took part in an on-demand peer review process. Cases were of radical or adjuvant intent of any histology and submitted on a voluntary basis. The outcome of contour peer review would be one of unchanged (UC), unchanged with variation or discretion noted (UV), minor change (M) or significant change (S). The time difference between the completion of the on-demand peer review was compared with the time difference to a hypothetical next Monday or Tuesday weekly peer review meeting. The time taken to review each case was also documented in the latter period of the pilot project.

Results: In total, 62 cases underwent peer review. Peer review on-demand provided dosimetrists with an average of an extra two working days available per case to meet treatment start dates. The proportion of cases with outcomes UC, UV, M and S were 45%, 16%, 26% and 13%, respectively. The mean peer review time spent per case was 17 min (12 cases). The main reason for S was discrepancy in imaging interpretation (4/8 cases). A lower proportion of oropharyngeal cases were submitted and had S outcomes. A higher proportion of complex cases, e.g. sinonasal/nasopharynx location or previous downstaging chemotherapy had S outcomes. The distribution of S outcomes appears to be similar regardless of clinician experience. The level of peer review activity among individuals differed by workload and job timetable.

Conclusion: On-demand peer review of the head and neck contour volume is feasible, reduces delay to the start of dosimetry planning and bypasses the logistical barriers of weekly meetings. An audit of participation will be required to ensure successful implementation.

Key words: Contour peer review; head and neck; on-demand radiotherapy peer review

Introduction

The work-up for head and neck intensity-modulated radiotherapy (IMRT) is complex and time-consuming. It may involve imaging, biopsies, patient consent, dental, nutritional, audiometric, ophthalmological and endocrine pre-assessment, immobilisation, contouring, treatment planning and dosimetric quality assurance. These processes need to be carried out in a timely manner to minimise biological and psychological detriment to the patient while meeting cancer treatment targets [1]. However, quality assurance throughout the pathway must not be compromised.

Peer review of radiotherapy treatment plans is recognised as an essential component of quality assurance [2]. Herein, peer review refers to the evaluation of a radiotherapy treatment plan by another oncologist [3]. The principal aims of peer review are to minimise random human error and unnecessary variation in practice. This concept is enshrined in the UK inter-discipline document 'Towards Safer Radiotherapy' and acknowledges the increasing need to apply the same rigorous attitude towards variation in oncologists' practices [4]. However, it is important that the introduction of any additional steps in the radiotherapy pathway does not lead to delays.

The optimum timing and scope of peer review remain to be established. Many centres adopt timetabled weekly

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quality assurance meetings [5,6]. Cases reviewed may be at varying stages of the planning pathway. In some cases, patients may have already commenced or be about to commence treatment. For peer review to be of maximal value, it is essential to ascertain which elements of the planning process it should focus on. The most appropriate timing of peer review in relation to the planning pathway can then also be determined.

The combination of complex anatomy and disease infiltration patterns in head and neck cancer, coupled with inter-clinician variation in experience and image interpretation for IMRT, render clinical target volume susceptible to large variations [7,8]. Inter-clinician contouring variation has been shown, even in the context of standardised head and neck trial protocols [9]. In a series of 75 peer reviewed head and neck cases in routine clinical practice, more than 90% of the discussion points were regarding target volumes or organs at risk [10]. In addition, in the 40 cases that underwent both pre-planning and post-planning peer review, virtually all the amendments were related to contouring and were identifiable at the pre-planning stage [10]. Hence, for head and neck cancer, as contouring is a major upstream weak link, peer review should concentrate on contour review before dosimetric treatment planning [11,12].

Historically, in the authors' institution, a weekly contour-specific peer review meeting was held on Tuesday at 17:00h before case submission for dosimetric treatment planning. However, increasing workload and time constraints led to barriers to continuing the weekly meetings. In recognition of the need to maintain contour peer review and to reduce delays in the planning pathway, an on-demand peer review process was piloted.

Materials and Methods

Clinician Profile

Between 3 November 2016 and 20 April 2017, four head and neck clinicians participated in peer review. All were based in the same centre and ranged in experience between 0.5 and 14 years of post-specialist training completion.

On-demand Peer Review Process

Cases were submitted by contouring clinicians for on-site peer review on a voluntary basis. Head and neck tumours of any histology with radical or adjuvant treatment intent were eligible. On completion of contouring, an 'await peer review' comment was entered on the contouring software by the contouring clinician. An e-mail was then sent out by the contouring clinician to peers detailing the clinical case scenario, rationale for dose and volume selection, treatment start date or 'review by' date and any specific clinical concerns. A peer would reply confirming availability for review. Peer review activity was incorporated within the pre-existing allocated radiotherapy planning time (8 working hours, equivalent to two Professional Activity sessions in UK job plan terminology, for each full-time oncologist). The focus of peer review was on target volumes. Organs at risk in each case were pre-contoured by an experienced head and neck specialist radiographer and were reviewed by the contouring clinician. Clinical details and relevant pre-treatment imaging were reviewed by the peer prior to contour review. All clinicians followed institutional protocols with delineation guidance reflecting contemporary UK practice. The guidelines were closely aligned to relevant prospective national studies as follows: oropharynx (CompARE trial), larynx and hypopharynx (NIMRAD trial), parotid (CO-STAR trial).

The peer review could be carried out either independently or alongside the contouring clinician. A key factor was to not introduce any delay into the radiotherapy pathway. Peer review could be carried out by more than one peer either together or sequentially, if the case was rare or complex, or a corroborative opinion was requested by the contouring clinician. Peer feedback was communicated in person or by e-mail. Peer-edited contours could also be saved by the peer in a separately labelled contour volume within the contouring software for comparison. The peer review outcome and the decision to incorporate any suggestions would be made by the contouring clinician responsible for the patient's care. A 'peer review completed' comment would be saved by the contouring clinician on the planning software, confirming the case being ready for planning.

Outcome Recording

The peer review outcome for each case was prospectively recorded in a database. The outcome of each case was categorised as one of unchanged (UC), unchanged with variation noted (UV), minor change (M) or significant change (S), as specified in Table 1. Towards the later period of the pilot system, the time taken to review each case was also recorded.

Details of changes were specified for each case to allow future audit on appropriateness and consistency of the change categories. Additional information collected included disease site, histology, TNM stage and pre-radiotherapy treatment modality. Cases were regarded as 'complex' in the presence of unusual histology or presentation, patient or previous treatment factors complicating contour volumes, or potential difficulty achieving neural or optic structures standard dose constraints.

Comparison with Weekly Meeting Process

The interval between 'await peer review' and 'peer review completed' comments on the contouring software ('Interval on-demand (OD)') was calculated for each case in relation to the number of working hours (08:00–18:00h, Monday to Friday excluding Bank Holidays).

Similarly, the interval between 'await peer review' to the nearest hypothetical weekly Monday 17:00h peer review meeting was calculated ('Interval Mon'). To account for Bank Holiday Mondays, a third calculation was made, this time between 'await peer review' to the nearest

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