

In the more than 10 years since the commercial introduction of electronic portal imaging devices, the adaptation of the technology for routine treatment verification remains sporadic. In 1998, an informal survey conducted by several members of the AAPM Task Group 58 indicated that, in the US, less than 30% of those clinics with these devices used them clinically on a routine basis. The poor utilization stemmed primarily from our lack of understanding of how the digital images might be used, exacerbated by the lack of software tools to manage and process the large volume of data. For a busy clinic, electronic portal imaging became a hindrance, rather than the catalyst that would enhance accurate and efficient treatment. Notwithstanding, valuable insights about setup variation and portal imaging were attained by those groups that had embraced the technology clinically. The EPID is first most, a very powerful device for acquiring large number of portal images and for establishing the baseline variation of daily setup for each clinic. Many investigations have shown that setup variation > 5 mm is not uncommon. It is important for a clinic to establish its baseline setup variation and to adapt the appropriate setup correction model, or models. There are 3 general models of utilization: (1) on-line visual examination for gross errors, (2) off-line quantitative evaluation with subsequent application of the necessary correction, and (3) on-line determination and application of the correction. For each model, the achievable level of setup accuracy in relationship with the time and effort required of the treatment personnel must be well understood. Selection of a particular correction model is best made by considering the treatment goal. Properly implemented, electronic portal imaging generally improves setup accuracy and can be cost-effective. Setup accuracy of the order of 2 to 3 mm can be achieved, a level deemed necessary for pursuing dose escalation. It should also be cautioned that there is a limit to the improvement in setup accuracy achievable with electronic portal imaging. Treatment setup is inherently a complicated 3D problem that cannot be totally addressed with the use of 2D projection radiographic images. Interestingly, despite its lackluster impact in the past, the future for EPID is exciting. With the advent of intensity modulated radiation therapy, the increase in networking capability, the commercial availability of software tools, and the improving image quality with new imaging technology, it seems inevitable that electronic portal imaging will be an integral component of modern radiation therapy.

Objectives:

1. To discuss issues related to the implementation of electronic portal imaging
 2. To elucidate different models to utilize electronic portal imaging clinically
- To discuss the role of electronic portal imaging in 3D conformal therapy

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