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Title **A Systematic Review of Photodynamic Therapy in the Treatment of Pre-Cancerous Skin Conditions, Barrett's Oesophagus and Cancers of the Biliary Tract, Brain, Head and Neck, Lung, Oesophagus and Skin**

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Aim

To systematically review the clinical effectiveness and safety of photodynamic therapy (PDT) in treating Barrett's esophagus, precancerous skin conditions, and the following cancers: biliary tract, brain, head and neck, lung, esophageal, and skin.

Conclusions and results

Evidence of effectiveness was found for PDT in treating actinic keratosis (AK) and nodular basal cell carcinoma (BCC) in relation to placebo, and possibly for treating Barrett's esophagus. However, the effectiveness of PDT in relation to other treatments is not apparent. High-quality trials need to compare PDT with relevant comparators for all meaningful outcomes, eg, quality of life and adverse effects. Research is also needed on patient experience of PDT and on its cost effectiveness. We included 88 trials reported in 141 publications. For AK, the only evidence of effectiveness was that PDT appeared to be superior to placebo. For Bowen's disease, better outcomes with PDT were suggested when compared to cryotherapy or fluorouracil. For BCC, PDT may result in similar lesion response rates to surgery or cryotherapy, but with better cosmetic outcomes. For nodular lesions, PDT appeared to be superior to placebo and less effective than surgery, but suggestive of better cosmetic outcome. For Barrett's esophagus, PDT in addition to omeprazole appeared to be more effective than omeprazole alone in long-term ablation of high-grade dysplasia and slowing or preventing progression to cancer. Firm conclusions could not be drawn for PDT in esophageal cancer. Research is needed on the role of PDT in lung cancer. For cholangiocarcinoma, PDT may improve survival when compared to stenting alone. Evidence on PDT for brain cancer and cancers of the head and neck was limited. Across the conditions and sites investigated, a wide variety of photosensitizes were used, and no serious adverse effects were linked to PDT.

Recommendations

1) Photodynamic therapy is most accepted in treating malignant and premalignant, nonmelanoma skin lesions. We found evidence of effectiveness for treating AK and nodular BCC in relation to placebo. However, we do not fully know the effectiveness of PDT in relation to other treatments. 2) The evidence suggests that PDT might be useful in treating Barrett's esophagus, but its effectiveness in relation to other treatments is not apparent. 3) The evidence for the other sites and conditions examined in this review is insufficient to draw firm conclusions. 4) We found no evidence implying that PDT should definitely not be used for certain clinical conditions.

Methods

See Executive Summary link www.hta.ac.uk/project/1854.asp.

Further research/reviews required

1) The optimal parameters of PDT need to be identified across the conditions studied. 2) High-quality trials need to compare PDT with relevant comparators for all meaningful outcomes, eg, quality of life and adverse events. Such trials should aim to establish the place of PDT in treating a given condition and should identify if subgroups of patients might respond differently to PDT. 3) Good-quality research is needed on patient experiences of PDT across the conditions investigated. 4) High-quality trials on rarer cancers, eg, brain and head and neck, are difficult to conduct. If RCTs cannot be conducted, other types of evidence may be considered. 5) This review will need to be updated as the results of ongoing trials become available.

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