

- Title** Photodynamic therapy for cancer treatment - an update
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- Reference** Technology Review Report - 003/2018, online:
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Aim

To assess the effectiveness, safety and cost-effectiveness of photodynamic therapy for cancer treatment.

Conclusions and results

Articles included consist of ten systematic reviews and one open-label RCT.

Effectiveness:

Skin Lesions

There was fair level of evidence to suggest that PDT was more effective for treatment of actinic keratoses (AKs) and cutaneous Bowen's disease when compared with cryotherapy. It was found to have similar effectiveness with cryotherapy and pharmacologic treatment in primary basal cell carcinoma but was less effective than surgical excision. In terms of cosmetic appearance, PDT had significantly better outcome in the treatment of AKs, cutaneous Bowen's disease and primary BCC. For treatment of malignant melanoma, more high quality evidence is needed to prove its effectiveness.

Barrett's Oesophagus

Evidence suggests that treatment failure risk was higher in PDT when compared with argon plasma coagulation. There was conflicting evidence when PDT was compared with proton pump inhibitor.

Lung Cancer

There was fair level of evidence to suggest that treatment response varied with cancer stage. PDT could be considered as a treatment option for patients with medically inoperable early-stage disease that is accessible by bronchoscopy. Evidence to date suggests that PDT may be most effective with small, superficial airway lesions, ≤ 1 cm in length. In locally advanced and symptomatic lung cancer, PDT with or without radiotherapy, can contribute to the relief of airway obstruction and haemoptysis, but it has not shown a survival advantage when compared with current treatments such as Nd:YAG laser therapy or radiotherapy alone.

Biliary Tract Cancer

Photodynamic therapy with biliary stenting was found to be superior to biliary stenting alone in improving survival, successful biliary drainage and quality of life in patients with nonresectable cholangiocarcinoma.

Head and Neck Squamous Cell Carcinoma

Evidence suggests PDT may have a role for palliative treatment of advanced or recurrent incurable disease. There was significantly better response rates for more superficial tumour (depth < 10 mm). For early stage disease, comparative and randomised studies are needed to prove its effectiveness.

Cervical and Vulva Cancers

There was insufficient evidence on the use of PDT in cervical and vulva cancers. Hence, more high quality evidence is needed in these areas.

Prostate Cancer

There was limited fair level of retrievable evidence to suggest that padeliporfin vascular-targeted PDT was superior over active surveillance for early stage prostate cancer.

Safety:

Skin Lesions

Adverse events, mainly photosensitivity, pain, erythema and pruritus were common with PDT in the treatment of AKs but mostly minor in nature. There were fewer adverse events in the PDT group compared with 5-fluorouracil in the treatment of cutaneous Bowen's disease. Most of the adverse events in the PDT group for the treatment of primary BCC were transient and manageable local reactions and of mild to moderate intensity. Photodynamic therapy with chlorin e6 for palliative treatment of malignant melanoma had minimal adverse events except mild pain.

Lung Cancer

Photodynamic therapy for the treatment of lung cancer can have serious adverse events including fatal haemoptysis, respiratory failure and tumour necrosis.

Biliary Tract Cancer

Photodynamic therapy with biliary stenting for palliative treatment of nonresectable cholangiocarcinoma was relatively well tolerated with minimal side effects.

Head and Neck Squamous Cell Carcinoma

The most common complication (phototoxicity) of PDT in palliative treatment of head and neck squamous cell carcinoma can be prevented by adhering to the stringent light protocol. Interstitial PDT showed the most severe

complications as could be expected because all patients presented with larger tumour volumes.

Prostate Cancer

Vascular-targeted PDT for the treatment of early prostate cancer resulted in an increase in the frequency of serious adverse events from one in ten men (10%) on active surveillance to one in three men (33%) in the PDT group. Most of the events were expected, genitourinary in nature, and self-limited.

Cost-effectiveness:

There was no retrievable scientific evidence on cost-effectiveness. The typical fees for PDT can range anywhere from US\$100 up to US\$4,000 or more for a single treatment. A series of PDT treatments can cost more than US\$10,000 over the course of a few months or years.

Recommendations (if any)

Photodynamic therapy may be used for research purposes in certain conditions such as AKs, cutaneous Bowen's disease and early inoperable lung cancer. More high quality trials are warranted for other cancers.

Methods

The following electronic databases were searched via OVID Interface: Ovid MEDLINE® In-process and other Non-indexed citations and Ovid MEDLINE® 1946 to present, EBM Reviews - Cochrane Central Register of Controlled Trials - January 2018, EBM Reviews - Cochrane Database of Systematic Reviews - 2005 to February 2018, EBM Reviews - Health Technology Assessment - 4th Quarter 2016, EBM Reviews - Database of Abstracts of Reviews of Effects - 1st Quarter 2016, EBM Reviews - NHS Economic Evaluation Database 1st Quarter 2016, PubMed and INAHTA database. Google was used to search for additional web-based materials and information. Additional articles were identified from reviewing the references of retrieved articles.

Written by

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