Results of PHOTO: Photodynamic versus white light-guided treatment of non-muscle invasive bladder cancer: randomised phase III trial of clinical and cost-effectiveness

Early bladder cancer is usually treated with surgery to remove the tumour, but it often comes back after surgery. The surgery is normally done using a white light to allow the surgeon to see the cancer in the bladder and remove it. However, there is an option to use blue light during surgery instead. When a chemical is added, the cancer glows under blue light and this is called photodynamic. This may help the surgeon see more of the cancer and remove it more effectively. It is not known if this blue light approach is better than standard white light and this is the focus of the study.

We wanted to find out if using blue light instead of white light at surgery could reduce how often the cancer returned after treatment. We also wanted to find out whether using blue light could reduce the overall cost to the NHS of treating early bladder cancer.

The results of PHOTO are now available and are described below.

Background

People who agreed to take part in PHOTO joined one of the following treatment groups:

- **Group 1**: **Standard white light surgery** – people in this group received surgery using a standard white light during the operation.
- **Group 2: Photodynamic surgery** – people in this group received surgery using a blue light during the operation.

Trial participation

538 people with early bladder cancer joined PHOTO between November 2014 and February 2018

- Half of the people (269) were in the standard white light surgery group
- Half of the people (269) were in the photodynamic surgery group

People from 22 NHS hospitals across the UK took part.

How well did photodynamic diagnosis work?

We found that, after nearly two years, bladder cancer had returned in:

- Four out of 10 people in the standard white light surgery group
- Four out of 10 people in the photodynamic surgery group

There was no difference between the treatment groups in the likelihood of bladder cancer returning after initial surgery.

The overall cost of photodynamic surgery was higher than that of standard white light surgery.

Questionnaires we asked participants to complete about their quality of life throughout the study did not show any differences between the groups.

What do these results mean?
These results show that photodynamic surgery did not work better than standard white light surgery, and therefore we cannot recommend its use in the treatment of early bladder cancer patients.

This is an important scientific finding. Although the study has not led directly to a new treatment that is better than the current surgical treatment, this information was not known before. There are many centres in the UK and around the world that use photodynamic surgery and the information collected in PHOTO will help doctors decide how to do early bladder cancer surgery in future. Furthermore, our findings will help the NHS decide what equipment should be prioritised to purchase for early bladder cancer surgery.

What will happen now?
Some study participants also agreed to donate a small sample of tissue left over from their bladder cancer surgery for laboratory research. We have collected these samples from participating hospitals and these are being analysed to help us better understand early bladder cancer.

We would like to thank everyone who took part in PHOTO. Without their contribution, this study would not have been possible.

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