NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE

INTERVENTIONAL PROCEDURES PROGRAMME

Interventional procedures overview of interstitial laser therapy for breast cancer

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee (IPAC) advise on the safety and efficacy of an interventional procedure previously reviewed by SERNIP. It is based on a rapid survey of published literature, review of the procedure by Specialist Advisors and review of the content of the SERNIP file. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared March 2003.

Procedure name

- Interstitial laser therapy for breast cancer.

Specialty society

- British Association of Surgical Oncology.

Description

Interstitial laser therapy is a minimally invasive technique, at present experimental, for treating small breast cancers. After locating the tumour using stereotactic techniques or ultrasound, the operator delivers laser energy into it via a needle probe, causing the tumour to shrink. Surgeons may then remove the tumour, although sometimes no further surgery is necessary.

Traditional treatments for small breast cancers include lumpectomy or mastectomy without preceding laser therapy. Other minimally invasive techniques include radiofrequency ablation or cryotherapy.

Benefits

Limited evidence was found that interstitial laser therapy reduced breast tumour size. No reliable evidence was found that interstitial laser therapy improved survival or recurrence rates compared with any other treatment. The specialist advisor indicated that the evidence of efficacy of interstitial laser therapy is inadequate.

Risks

Limited evidence was found that interstitial laser therapy caused bleeding, pain, gaseous rupture of tumour and skin burns.

Literature reviews

Appraisal criteria

Studies of interstitial laser therapy for breast cancer were included if they examined the outcomes of tumour regression, survival, recurrence, complications and complete pathological excision.

List of studies found

No systematic reviews or controlled trials were found.

Three case series[1-3] and one case report[4] were found.

Table 2 Summary of key efficacy and safety findings

Study details	Key efficacy findings	Key safety findings	Key reliability and validity issues
Harries, 1994[1] Case series : UK 44 people with breast cancer (no further details) treated with laser before surgery Follow up 2 to 26 months	4 people showed no histological sign of laser damage in the tumour 43/44 people disease-free at follow up; 1 died of unrelated disease	Haemorrhage (< 50 ml): 1 person Stopped treatment because of pain: 3 people	Uncontrolled case series. Follow up short for some people..
Akimov, 1998[2] Case series Ukraine 35 people with breast cancer: • 28 had resection 1-11 days later; mean age 53 years (range 38 to 78 years); mean tumour size 3 cm (range 1-6 cm) • 7 had no further treatment, age range 34 to 78, tumour size range 2.5-4 cm Follow up: 5-33 months	**Laser treatment alone** Local tumour control: 5/7 people Disease-free at follow up: 3/7 people **Laser treatment followed by surgery** 3-year disease-free survival: • 27% (pre-menopausal) • 92% (menopausal)	Gaseous rupture: 1 person Skin burns: 4 people	Uncontrolled case series. Follow up short for some people.. Not clear how 3 year survival rates calculated.

Study details	Key efficacy findings	Key safety findings	Key reliability and validity issues
Lai, 1997[3] Case series UK 20 people aged 34 to 79 years (median 57 years) with clinically palpable breast cancer treated with laser before surgery	Laser induced necrosis: 18/20	Incorrectly placed laser: 2/20	Uncontrolled case series. Published only as abstract. No follow up data. No clinical outcome data.
Steger, 1989[4] Case report UK 1 woman aged 51 years who had declined surgery, radiotherapy and tamoxifen	Tumour volume decreased from 3 to 0.5 cm^3 after one treatment but then increased again within 10 weeks and did not respond to a second laser treatment	No data	Single case report.
Dowlatshai et al (2002) [5] Case series 54 patients - 50 invasive - 4 insitu	In two groups of 14 patients , 93% and 100% of the tumour showed complete destruction. 2 unresected cases there was some shrinkage	Authors report that none of patients sustained any adverse event.	This study was identified during the consultation process (June 2004) Lesions were removed for pathological evaluation in 52 patients.. Limited information.

Validity and generalisability of the studies

Four studies, three small case series and one case report were found. These provide limited information about the safety and efficacy of interstitial laser therapy.

Specialist Advisor's opinions

Specialist advice was sought from consultants who have been nominated or ratified by their Specialist Society or Royal College.

- There are no randomised controlled trials of this technique.
- No one should be using it outside a clinical trial because long-term effects are unknown.

References

1. Harries SA, Amin Z, Smith MEF, Lees WR, et al. Interstitial laser photocoagulation as a treatment for breast cancer. *British Journal of Surgery* 1994; 81: 1617-9.

2. Akimov AB, Seregin VE, Rusanov KV, Tyurina EG, et al. Nd:YAG interstitial laser thermotherapy in the treatment of breast cancer. *Lasers in Surgery & Medicine* 1998;22: 257-67.

3. Lai LM, Mumtaz H, Ripley PM, Hall-Craggs MA, et al. Image-guided interstitial laser photocoagulation for the treatment of breast cancer. *Lasers in Medical Science* 1997;12: 297.

4. Steger AC, Lees WR, Walmsley K, Bown SG. Interstitial laser hyperthermia: a new approach to local destruction of tumours. *British Medical Journal* 1989;299: 362-5.

5. Dowlastshai, K., Francescatti, D.S., Bloom, K.J. Laser therapy for small breast cancers. *American Journal of Surgery* 2002; 184 (4) 359-363.