TITLE: Cryotherapy for Non-Small Cell Lung Cancer: A Review of the Clinical Effectiveness

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CONTEXT AND POLICY ISSUES:

Cryotherapy, also called cryosurgery or cryoablation, a technique in which probes inserted into
the tissue deliver extremely cold temperatures to destroy target tissue, has received expanding
indications for malignant tumor therapy. A review of the clinical effectiveness of cryotherapy in
the treatment of non-small cell lung cancer (NSCLC), the most common type of lung cancer, is
needed.

RESEARCH QUESTION:

What is the clinical effectiveness of cryotherapy for the treatment of non-small cell lung cancer?

METHODS:

A limited literature search was conducted on key health technology assessment resources,
including PubMed, OVID’s Medline and Embase, the Cochrane Library (Issue 4, 2008),
University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan,
international HTA agencies, and a focused Internet search. Results include articles published
between 2003 and October 2008, and are limited to English language publications only. No
filters were applied to limit the retrieval by study type. Internet links are provided, where
available.

SUMMARY OF FINDINGS:

Our literature search identified two recent observational studies on the clinical effectiveness of
cryotherapy on NSCLC survival. There were no systematic reviews or randomized controlled
trials found.

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The first study included 346 patients with lung cancer treated with cryoablation, of whom 97 underwent post ablation chemotherapy, 82 patients underwent post ablation radiotherapy, and the remaining patients did not have further therapy. The study found cryoablation alone resulted in one, two, and three-year survival rates of 72.46%, 51.49% and 28.15%, respectively. With the addition of post ablation chemotherapy, the survival rates were 73.19% (one year), 49.48% (two year), and 24.19% (three year). With the aid of post ablation radiotherapy, survival rates were 79.27%, 58.53% and 24.19% at one year, two years and three years, respectively. Peripheral blood T-lymphocytes were increased post-operatively, which suggests that cryotherapy may also help through immune system stimulation.

The second study included 253 cases of advanced NSCLC who underwent cryosurgery. After cryosurgery, the tumors were significantly reduced in size and superior vena cava obstructive syndrome was no longer present. This short term efficacy was found in 61% of patients three months after ablation. Median survival time was 11.98 months, and the one- and two-year survival rates were 41.1% and 27.59%, respectively. Side effects of cryotherapy were hemorrhage from the lung (68%), fever (75%), and pneumothorax (25%).

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING:

Evidence is not sufficient to determine the benefits and harms of cryotherapy for NSCLC. No studies comparing the effect of cryotherapy with other treatment modalities for NSCLC were identified, and therefore it is difficult to determine the clinical value of the treatment. Longer follow-up to 5 years is also needed to draw a conclusion on the clinical effectiveness of cryotherapy. The combination of cryotherapy and chemotherapy has shown its effects on tumor growth in in vivo and in vitro experiments on human lung cancer models. This points to the possibility of future studies on combination therapy.

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