Successful co-administration of electrohyperthermia and bevacizumab in non-small cell cancer: A case presentation

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Introduction

Non-small cell lung cancer (NSCLC) exceeds in number the 85% of all malignant lung cancers. In metastatic disease the principle goal is to prolong survival with the least toxicity keeping in mind the importance of patients' quality of life.

Bevacizumab **(Avastin®)** has been accepted as first line treatment in combination with platinum based chemotherapy and maintenance therapy in NSCLC. Bevacizumab can be added safely to several chemotherapeutic agents, however there is no data on co-administration with thermotherapy. No robust evidence exits about the beneficial effect of loco-regional thermotherapy on overall survival, but it can be used successfully in symptom palliation.
Electrohyperthermia is a form of thermotherapy using electromagnetic field.

Medical history

- In the 64 year old male patient a solitary lung lesion was captured by screening chest radiograph.
- **2008 February**

  The lesion was diagnosed as stage III/A lung cancer and a right upper lobectomy was made.

  Pathology result: adenocarcinoma, pT2 (3,8cm), pN1 (1/1), vascular invasion

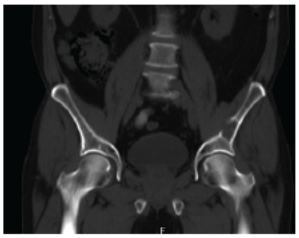
  He rejected adjuvant chemotherapy.
- **2009 June**

  one mono-localized (left hip bone) osseal metastasis was proved with unequivocal and consistent results of CT, MRI and bone scan

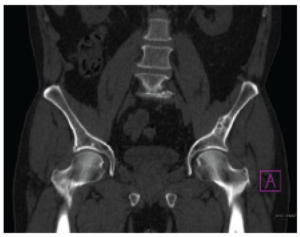
First-line treatment

- **2009 July- November**
  - 6 cycles of bevacizumab (7,5 mg/ttkg) + paclitaxel (175 mg/m^2) + carboplatin (400 mg/m^2) 3 weekly + zoledronic acid (4 mg 3 weekly)
  - Result:: stabile disease
- **From November 2009**
  - Bevacizumab (7,5 mg/ttkg) maintenance therapy + zoledronic acid (3 weekly)
  - Loko-regional elektro-hyperthermia (Oncothermia, OT)

    given OT three times a week with the maximal tolerated dose of 70W (EHY 2000®, Oncotherm Ltd, Paty, Hungary, 20 cm electrode)
  - The treatment is still ongoing, no > grade 1 adverse reaction emerged
  - Serial MRI imaging shows the lesion diminished in size



Metastasis in left hip bone
Augustus 2009



Regression
May 2010

Oncothermia

Oncothermia is a loco-regional deep hyperthermia using the EHY-2000 device. It is a rapidly developing adjuvant treatment modality in cancer therapy.

Principles of oncothermia are direct continuation of the classical hyperthermia with addition of the modern technological and bioelectromedical knowledge. Its main goal: to maintain focused energy absorption in extracellular fluid in the malignant lesion and selectively destroy the cellular membrane of tumor cells. One of the realization of oncothermia principle is the device EHY2000. It uses the impedance selection to focus the absorber energy, and with the modulated electric field partly activates membrane connected pathways of apoptosis as well as partly babblings and destroys the membrane of malignant cells.[3].

The effect of oncothermia is synergistic with irradiation and several chemotherapeutic agents. There is some evidence that it may facilitate immun-defence mechanisms, alleviate pain and ameliorate way of feeling.

Conclusion

The expected 5 year survival-rate of advanced NSCLC is around 2%. This relatively small efficacy of the present oncotherapies explains the intensive search for new , new therapeutic modalities.

In the present time platinum-based doublet and concomittantly administered bevacizumab can ensure the longest overall survival.

In this case oncothermia did not compromise the efficacy of bevacizumab and its co-administration was safe, having no extra side effects by its complementary application.

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2. Sandler A, et al. J Thorac Oncol. 2010 Aug 3. [Epub ahead of print] PubMed PMID: 20686429.
3. Andocs G et al. Electromagn. Biol. & Medicine, 2009; 28:148 165