ELECTROLYSIS TREATMENT IN MATERNAL BREAST CANCER

By: Lindsay Stine and Jose Paz
Main Concepts

- Also known as Electrochemical Treatment (ECT).
- Multiple electrodes are placed into a tumor and a current is passed between them.
- Tumor cell death is caused by ion mobility, $pH$ change, and disruption of cell communication.
Background

- Electrolysis treatment was common before antibiotics were regularly used.
- ECT is a normal practice in veterinary medicine.
- It is a common form of treatment in China.
Maternal Breast Cancer

- 1 in every 3000 women will be diagnosed with breast cancer during pregnancy.
- Women 32 to 38 years old are the most likely to develop breast cancer due to pregnancy.
- Due to the change in breast anatomy, tumors are often not found until they have progressed into late stages.
- Treatment options are limited. Currently, maternal breast cancer is treated with low dose chemotherapy or surgery. Treatment may be postponed until fetal viability age.
- All treatment options significantly increase the risk of miscarriage and still births.
- Abortion does not significantly increase chances of survival for the mother.
- Maternal mortality rates are high.
<table>
<thead>
<tr>
<th></th>
<th>Nonpregnant Woman</th>
<th>Pregnant Woman</th>
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<tbody>
<tr>
<td>Estiol</td>
<td>0.002-0.1 mg/24 Hours</td>
<td>50-150 mg/24 hours</td>
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<tr>
<td>Estradiol-17β</td>
<td>0.1-0.6 mg/24 hours</td>
<td>15-20 mg/24 hours</td>
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Benefits of Electrolysis Treatment

- Electrolysis treatment is administered under local anesthetic.
- Typically only one treatment is needed.
- Metastasis is unlikely.
- Other treatment can be applied immediately following ECT.
- Virtually painless and easy to recover from.
- It is unlikely to significantly impact a fetus.
Primary Article: Time-Dependent Micromechanical Responses of Breast Cancer Cells and Adjacent Fibroblasts to Electric Treatment

Mayan Lia Israeli and Daphne Weighs

August 2, 2011
Electrolysis treatment using plated cells.

- Six well plate.
- Polycarbonate Inserts.
- Platinum electrodes.
- DC-Power source.
- A 3 volt current was applied for 8 minutes to a 15X15 mm² area.
CETA 1.0
CETA 2.0
CETA 3.0
Cancer cells prior to treatment.
25 minutes after treatment, the cells exhibit loss of anchorage and “ball up.”
2 hours after treatment, cells have regained normal shape and show signs of death.
- Proliferation of neoplastic cells was reduced by 45% after first treatment.
- Adjacent normal tissue did not show significant cell death.
- There is a window of cell adhesion disruption during which chemical treatment can be applied.
Secondary Article:
Radiological Evidence of Response to Electrochemical Treatment of Breast Cancer

E. Azevedo, G. Svane, and B. Nordenstrom
• The patient was a 59-year-old woman with a epithelial breast tumor.
• Two electrodes were used to supply a 10-15 mA current with an application of 10 Volts.
• After one hour the current was increased to 70 mA. The treatment lasted two hours.
Two days after treatment, a mammogram showed reduction in the tumor size.

A slight distortion in the surrounding tissue was observed.

Follow up two years after treatment showed no indication of tumor regression.
After one treatment.
Electrolysis Treatment During Pregnancy.
- 231 breast cancer cell line.
- A ≈ 3 volts to the plate for 8 minutes.
- Immediately after treatment.
Four hours after treatment cells exhibit a round morphology.
■ 10 hours after treatment.
Phase II

■ Addition estrogen to cells.
■ Varying treatment intervals and voltage.
References:


We would like to say a huge thank you to Dr. Russell for her help and continual encouragement!