became obvious that this was in fact a very unusual form of high-grade B-cell lymphoma in which the neoplastic cells multiply mainly or entirely within the microvasculature of peripheral tissues and organs (angiotropic large-cell lymphoma). It is not known why the lymphomatous cells remain in the microvasculature without infiltration of the bone marrow, lymph nodes or circulation.

Twenty per cent of cases of angiotropic large-cell lymphoma have a chronic cutaneous presentation, which may be self-limiting and is rarely fatal. The other 80% have a rapidly fatal course with visceral involvement, as demonstrated in the case under discussion. Half of these patients also have cutaneous involvement. Neoplastic cells are seldom found in peripheral blood smears. The liver (48%) and kidney (79%) are frequently involved in autopsy studies, and biopsy of these organs seems a logical diagnostic procedure during life. Few data are, however, available on treatment.

**Final diagnosis.** Angiotropic large-cell lymphoma (malignant angio-endotheliomatosis).

**REFERENCES**


**SHORT REPORT**

Primary care fetal assessment — low-cost fetal arousal testing

GJ Hofmeyr, T Lawrie, M de Jager

Conventional vibro-acoustic stimulation tests require expensive vibro-acoustic stimulators and electronic monitoring equipment. Attempts to simplify the test have been made using an electric toothbrush and razor but even these simpler devices are not available in most primary care settings. We compared the sound pressure generated by a Corometrics 146 vibro-acoustic stimulator to that of an empty soft-drink can in an in vitro study. The can compared favourably to the conventional vibro-acoustic stimulator.

Assessment of fetal well-being forms an important part of prenatal care. Education of mothers about the importance of fetal movements is used to screen for fetal distress, and serial measurements of the symphysis-fundus distance are used to assess fetal growth. When confirmation of fetal well-being is required, e.g. because of reduced movements or poor growth, the main diagnostic test used is cardiotocography (the non-stress test). The time required for non-stress testing may be reduced by means of the acoustic stimulation test. However, these tests require expensive electronic monitoring equipment and fetal acoustic stimulators, which are not available in most obstetric primary care settings. Attempts to simplify the testing procedure have included the use of maternal perception of evoked fetal movements rather than fetal heart rate tracings, and replacement of the purpose-built vibro-acoustic stimulator by an electric toothbrush or razor. Even the latter simple devices are not available in most primary care settings, may be difficult to obtain, need to be protected from theft, and may not have working batteries when needed.

We therefore investigated the possibility of using a simple, non-electric, readily available device for fetal arousal testing — an empty soft-drink can.
Materials and methods

An *in vitro* experiment was set up to compare a soft-drink can and a commercially available fetal acoustic stimulator in respect of the sound pressure generated.

To simulate the attenuation of the sound through tissue and fluid when it passes into the intra-uterine environment, a model was constructed with a tissue layer consisting of an approximately 30 mm thick freshly delivered placenta above a 30 mm layer of normal saline, separated by thin plastic membranes. Sound pressure was measured with a Brüel & Kjær type 2219 sound level meter (Brüel & Kjær, Denmark) in the 'slow' response mode. The sensor of the sound pressure meter was placed in contact with the plastic membrane below the fluid layer, and the sound stimulus applied directly to the membrane over the tissue layer.

The sound stimulus was applied randomly by means of a commercially available fetal acoustic stimulator (Model 146, Corometrics Medical Systems) and a random selection of empty aluminium soft-drink and beer cans of the type in which a ring is lifted to fold back an opening in the lid. The cans were held with the bottom against the model and the thumb and middle finger supporting the rim of the top of the can. The index fingertip was used to depress the ring opener of the can gently (~5 mm) or completely against the lid and allow it to snap back, producing a sound. The tests with the cans were classified according to whether the sound made was 'rattling' or resonant, and whether the opener was depressed gently or completely (Table I).

<table>
<thead>
<tr>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Range</th>
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<td></td>
<td>68.7</td>
<td>2.1</td>
<td>69</td>
<td>64-72</td>
</tr>
<tr>
<td>Cans with resonant sound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm flick</td>
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<td>1.7</td>
<td>76</td>
<td>74-80</td>
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<tr>
<td>Gentle flick</td>
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<td>1.8</td>
<td>68</td>
<td>64-71</td>
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<tr>
<td>Cans with rattling sound</td>
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<tr>
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<tr>
<td>Gentle flick</td>
<td>64.5</td>
<td>1.1</td>
<td>64</td>
<td>63-66</td>
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</tbody>
</table>

Results

The sound pressure transmission through the simulated tissue and fluid medium was reasonably similar to that produced by the acoustic stimulator with all the various soft-drink cans used. The closest approximation to the acoustic stimulator was achieved with the use of cans that gave a resonant (musical) sound, with gentle depression of the ring opener to produce the sound. Most cans examined could be made to produce a resonant sound by moving the ring opener sideways to eliminate any rattling.

Discussion

*In vitro* testing has shown that the sound produced by a commercial fetal acoustic stimulator can be closely mimicked with an inexpensive, widely available device — an empty soft-drink can. We are proceeding with clinical evaluation of the device, using clinical end-points (operator perception of fetal movements and auscultated fetal heart rate accelerations). If the results of the clinical evaluation support the use of a soft-drink can as an acoustic stimulator, the benefits will be self-evident.

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REFERENCES


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