



Souvenir scanning – safety aspects (2012)

Souvenir, or keepsake, scanning (“ultrasound for fun”) has become big business in some countries. Souvenir scanning means that the fetus is submitted to an ultrasound scan without a medical indication. The purpose is to obtain static ultrasound images or ultrasound video clips of the unborn baby, usually three-dimensional (3D) static images or four-dimensional (4D) video clips. A search of the web gives thousands of hits for websites advertising such scanning.

The World Federation of Ultrasound in Medicine and Biology has stated that “*WFUMB disapproves of the use of ultrasound for the sole purpose of providing keepsake or souvenir images and/or recordings of the fetus*” (1). The European Committee for Medical Ultrasound Safety (ECMUS) also advise against the use of medically non-indicated, or commercial, prenatal ultrasound scanning (2).

Recommendations:

1. *Ultrasound scans should not be performed solely for producing souvenir images or recordings of a fetus or embryo.*
2. *The production of souvenir images or recordings for the parents to keep is reasonable if they are produced through a diagnostic scan, provided that this does not require the ultrasound exposure to be greater in time or magnitude (as indicated by the displayed MI and TI) than that necessary to produce the required diagnostic information.*
3. *Ultrasound should be performed only by competent personnel who are trained and updated in ultrasound safety matters*

The reason why medical ultrasound societies advise against souvenir scanning is that a negative effect of ultrasound scanning on the fetus cannot be entirely excluded. The risks and benefits of scanning an embryo or fetus must be balanced, and for souvenir scans there are no medical benefits.

Are there any risks involved?

A meta-analysis and review of the epidemiologic studies on ultrasound safety has given reassuring results (3). The authors searched the literature extensively and analysed the data according to the guidelines for Cochrane reviews. They found no indication of deleterious effects from obstetric ultrasound, but they did find an association between ultrasound exposure *in utero* and non-right handedness in boys (3). This association has been confirmed in one extended meta-analysis, which demonstrated that the association is not only confined to boys (4). A discussion of the epidemiological studies is addressed in another ECMUS tutorial (5). There is, however, one caveat about the reassuring results from epidemiological studies. All available epidemiological evidence about ultrasound safety is derived from scanners in use before 1992. Today’s scanners can produce 10-15 times higher output levels than the scanners used in the studies cited (6). Therefore, if biological effects of ultrasound were dose-dependent, the updated reviews of the epidemiological studies are of little help to ultrasound operators and pregnant women of today.



Do we need to take the association between ultrasound exposure in utero and non-right-handedness seriously?

The association between ultrasound and non-right-handedness is derived from three Nordic randomized controlled trials (7, 8, 9). It is not fully known what determines hand preference in humans, but it is theoretically conceivable that ultrasound may influence neuronal migration in the developing fetal brain, and, thus, be able to disturb lateralization of the brain and induce shifts in handedness (10). An experimental study lends some support to this theory. Ang et al. studied the effect of ultrasound on cell migration in the brain of mouse fetuses (11). The fetuses of pregnant mice were exposed to low energy ultrasound for 5 to 420 minutes. The results showed that, for mouse fetuses exposed to at least 30 minutes of ultrasound, a greater number of neurons in the brain failed to reach their proper position than in those subjected to lower exposures. The authors also presented evidence from another experiment supporting the hypothesis that the migration disturbance was not caused by temperature rise or cavitation, but possibly by radiation force or microstreaming. It is, however, difficult to know if the results of this experimental study on mouse fetuses apply to human fetuses. In addition to the mouse study, a study on chicks has shown that memory impairment occurred following 4 and 5 min of pulsed Doppler exposure, while B-mode exposure did not affect memory function (12). The applicability of the results of the study on chicks to human fetuses is also uncertain.

Is souvenir scanning an issue?

The problem is that we do not know for sure whether exposing a human embryo

or fetus to today's diagnostic ultrasound is entirely without risks. Therefore possible risk must be balanced against possible benefits of the scan to the fetus or to the mother. This should apply to both souvenir scans and medically indicated scans. Before performing a scan with a medical indication, the operator should ask *"Is this scan essential? Will the results of the scan change the management of the patient?"* De Crespigny et al. have discussed this issue in a provoking editorial (13). They suggest *"that it seems quite possible that many women receive benefits from souvenir scans that are comparable to those that they receive from diagnostic ultrasound"*. This implies, however, that the diagnostic scan was not really indicated, and highlights the importance of only performing scans that are essential for improving the management of the pregnancy. Unnecessary medically indicated scans should be banned in the same way as souvenir scans performed without a medical indication.

By definition, souvenir scanning has no medical benefits (if it did it would no longer be a souvenir scan, but a medically indicated scan). Any benefits produced by souvenir scanning can therefore not outweigh any possible risks. This is why souvenir scanning should be opposed. It can, of course, be argued that souvenir scanning is not the business of medical professionals. The medical profession does not advocate it, but people should be able to do whatever they want with their money. On the other hand, as professionals involved in ultrasound, we must stand up for the unborn babies, if we think souvenir scanning is wrong.



References

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