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MAIN SUBJECT HEADING:

AN	HU	AT	IH	M
ANALYTICS	HUMAN EFFECTS	ANIMAL TOXICITY	WORKPLACE PRACTICES-ENGINEERING CONTROLS	MISCELLANEOUS

SECONDARY SUBJECT HEADINGS: AN HU AT IH M

- Physical/Chemical Properties
- Review
- Animal Toxicology
- Non-occupational Human Exposure
- Occupational Exposure
- Epidemiology
- Standards
- Manufacturing
- Uses
- Reactions
- Sampling/Analytical Methods
- Reported Ambient Levels
- Measured Methods
- Work Practices
- Engineering Controls
- Biological Monitoring
- Methods of Analysis
- Treatment
- Transportation/Handling/Storage/Labelling

Glaser

DEFORMITY AND INTRA-UTERINE DEATH AFTER SHORT-WAVE THERAPY

INVESTIGATIONS ON EXPERIMENTAL ANIMALS

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Summary: 749 pregnant rats were subjected, in the first 16 days of pregnancy, to a single short-wave treatment. During this, short lasting rectal temperatures of 42° C were reached. On the 20th day of pregnancy 7,800 fetuses were delivered by Caesarian section, the corpora lutea of pregnancy were counted and matched up to the number of matured fetuses. As a result of the high temperature treatment numerous malformations arose, the malformation type corresponding to the teratogenic phase at the time of the short wave treatment. Before implantation, the short-wave therapy was lethal for the majority of the embryos.

Year after year more noxae are found which are able to disturb the intrauterine development of mammalian embryos. The teratogenous effect of ionizing rays is long known, as well as the radiomimetic effective cytostatics. Embryo pathema as a consequence of various infectious diseases were recognized, clinically confirmed medications were found to be very dangerous to the development of the embryo, let us merely mention thalidomide.

Until recent years little importance has been given to increased temperature on the development of the human embryo. In contrast to cold-blooded and bird embryos, where increased breeding temperatures were long considered teratogenously effective, the human embryo was considered protected from injurious temperatures because of its intrauterine position. On the other hand, attempts are made in gynecological diseases to warm up the pelvic organs with short-waves. The question, does this possibly mean an injury during early pregnancy, has not been answered.

Own experiments

We subjected 749 pregnant rats during the first 16 days of pregnancy to an abdominal treatment with short-waves (wave length 11 m \ 27.12-MHz, Ultratherm 603-Siemens, Vortex current electrode Minode. Within 10 minutes rectal temperatures of about 42° were reached. Caesarian sections were done on the

20th day of pregnancy; a total of 7800 embryos were examined. The results are evaluated from 2 viewpoints.

A. Malformations ~~thorax~~

It was found that during the total organogenesis a pronounced sensitivity existed in the developing organ structures to the warming up by short-waves. Aimed for malformations in large numbers were produced, where the type of malformation corresponded to the teratogenous phase of the point in time of treatment. There resulted a wide malformation spectrum of severe CNS-malformations (diag. 1), deformity of the eyes (diag. 2), cleft palates (diag. 3), and especially malformations of the tail and extremities (diag. 4 and 5).

B. Intrauterine deaths of embryos

A count of the corpora lutea graviditatis at the Caesarean section compared to the number of matured embryos indicated the number of dead embryos. The result was as follows: subsequent to shortwave treatment, especially during the first days of pregaancy, there occurred a large number of intrauterine embryo deaths. Treatment on the 1st and 2nd day of pregnancy caused 65% of deaths compared to 25% in the control series (diag. 6)

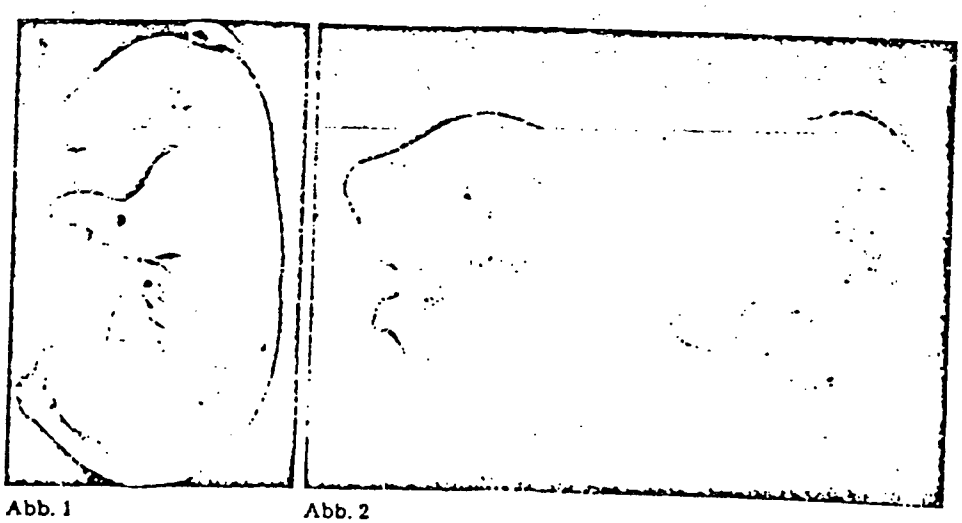

Abb. 1 Abb. 2

Abb. 1: ZNS-Mißbildung (Protrusio cerebri) nach Kurzwellenbehandlung am 9. und 10. Schwangerschaftstag. — Abb. 2: Anophthalmie des re. Feten, der li. zeigt eine normale Anlage des Auges. Anophthalmien und Mikrophthalmien traten nach Hyperthermie am 10. Schwangerschaftstag auf.

Diag. 1: CNS malformation (Protrusio cerebri) after shortwave treatment on the 9nth and 10nth day of pregnancy.
Diag. 2: Anophthalmia of right fetus, the left shows a normal position of the eye Anophthalmia and microthalmia occurred subsequent to hyperthermia on the 10nth day of pregnancy.

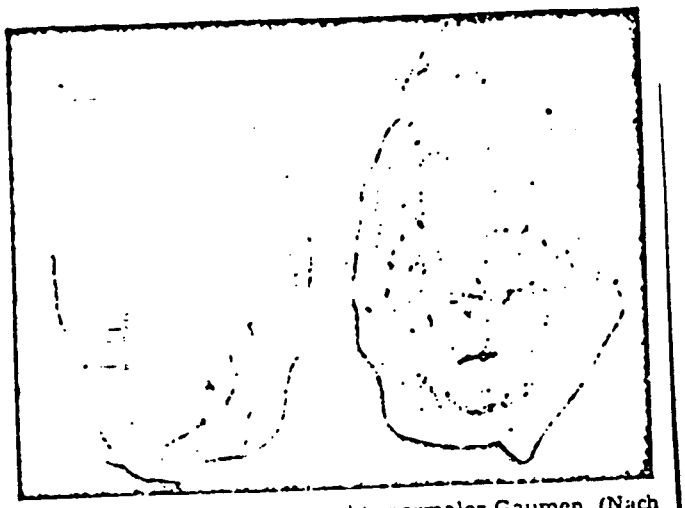

Abb. 3: Links Spaltgaumen, rechts normaler Gaumen. (Nach KW-Behandlung am 15. Schwangerschaftstag).

Diag. 3: left cleft palate, right normal palate (subsequent to short-wave treatment on the 15nth day of pregnancy.

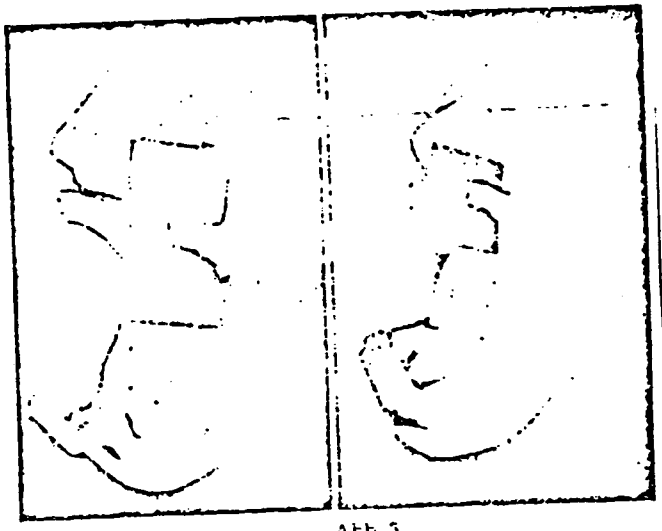

Abb. 4 Abb. 5

Abb. 4: Spalthandbildung: typische und sehr häufige Mißbildung nach KW-Durchflutung am 13. und 14. Schwangerschaftstag.

Abb. 5: Spalthand, gleichzeitig Stummelschwanz, ebenfalls häufig nach KW-Behandlung am 13. und 14. Schwangerschaftstag.

Diag. 4: Cleft hand formation, typical and very frequent malformation subsequent to short wave treatment on the 13nth and 14nth day of pregnancy.

Diag. 5: Cleft hand, and simultaneously a stump tail, also frequent after shortwave treatment on the 13nth and 14nth day of pregnancy.

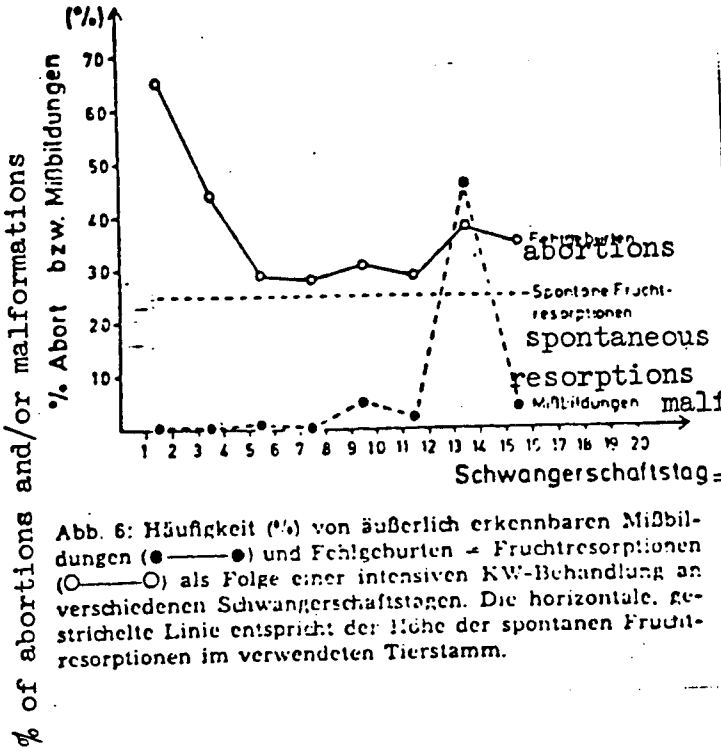

Abb. 6: Häufigkeit (%) von äußerlich erkennbaren Mißbildungen (●——●) und Fehlgeburten = Fruchtresorptionen (O——O) als Folge einer intensiven KW-Behandlung an verschiedenen Schwangerschaftstagen. Die horizontale, gestrichelte Linie entspricht der Höhe der spontanen Fruchtresorptionen im verwendeten Tierstamm.

Diag. 6: Frequency (%) of externally recognizable malformations (●——●) and abortions = embryo resorptions (o——o) as a result of intensive shortwave treatment on various days of pregnancy. The horizontal broken line corresponds to the height of spontaneous embryo resorption in the animal species used.

It should be emphasized that injuries to the embryo, i.e., malformation and deaths occurred only with maternal rectal temperatures of at least 40° for a 10 minute duration. At lower temperatures no embryonic injuries resulted (diag. 7). High frequency heat by itself has no injurious effect, but high temperatures at the border of the physiological areas which do not as yet injure the maternal organ, do already injure irreversibly the rapidly growing embryonal cells.

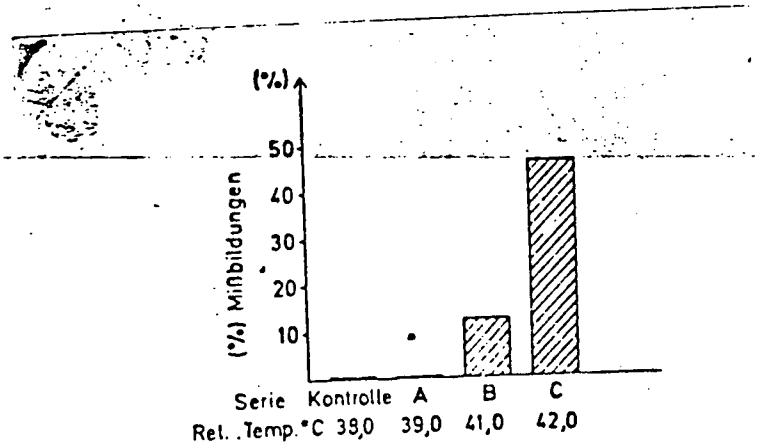

Abb. 7: Abhängigkeit der Mißbildungshäufigkeit von der Intensität der KW-Behandlung, d.h. von der erreichten Temperatur. Die angegebenen %-Werte wurden bei KW-Behandlung am 13. und 14. Schwangerschaftstag gewonnen.

Diag. 7: Dependency of malformation frequency on intensity of shortwave treatment, i.e., on the temperature reached. The given % values were obtained from shortwave treatment on the 13nth and 14nth day of pregnancy.

Due to the thermo penetration high frequency treatment is able to release heat dirrectly in the depth of the organ being treated. It differs basically from all other heat applications procedures, such as water baths, heated air, moor-or sand baths. We shall merely refer to special physical-technical differences in the depth effect of individual high frequency treatments (long wave diathermy, short wave, decimeter wave, microwave.

Of medical and biological concern is the recognition, that there is a selective thermo-sensitivity in certain cells and cell systems. The selective thermo sensitivity of the rapidly dividing embryonal cells in the high frequency electromagnetic alternating field serves us as a concept for a possible influence on tumor cells, which, doubtless, show a certain parallel to embryonic cells.