

Telethermography of the uterine cervix preliminary results

by

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There is no doubt that the introduction of telethermography for diagnostic purposes represents one of the most important steps forward in the field of medicine in recent years.

Telethermography, i.e., photographic recording and measurement of infrared rays, studies changes in the heat emission of any purposely exposed body surface.

The changes in heat emission of a body surface depend on:

- a) changes in vascularisation of the area;
- b) changes in the cellular metabolism of the superficial tissues.

If we assume a normal vascular supply, any alteration in heat emission from a surface under study must be traced back to an abnormal metabolic state of the superficial tissues which make up this area.

Under these conditions a telethermographic investigation may be defined as a metabolic investigation of a body area.

Metabolically, neoplastic tissue differs markedly from any other tissue; its metabolic activity is of the anaerobic type, which involves a reduced formation of energy links and an increased production of heat.

Thus, if vascular supply is normal, thermographic exploration will show neoplastic tissue to be markedly hyperthermal in comparison with non-neoplastic tissue.

In the light of these facts we thought it interesting to carry out a telethermographic study of the uterine cervix.

MATERIALS AND METHODS

We studied 33 patients hospitalized at the Second Obstetric & Gynaecological Clinic of the University of Padua, and ranging in age from 20 to 75.

The patients were placed in lithotomy position and the speculum was used to reveal the cervix, which was gently but carefully cleaned with gauze. After 10 minutes at a constant temperature of 20 °C, an AGA Thermovision thermograph was used to record infrared emission from the cervix.

The instrument was placed 80 cm from the perineal plane in such a manner that the axis of exploration coincided with that of the vagina. (fig. 1).

As reference point we placed on the external uterine orifice a metal indicator which was clearly visible during thermoscopy and on the thermograms as a colder point because of its more rapid heat loss.

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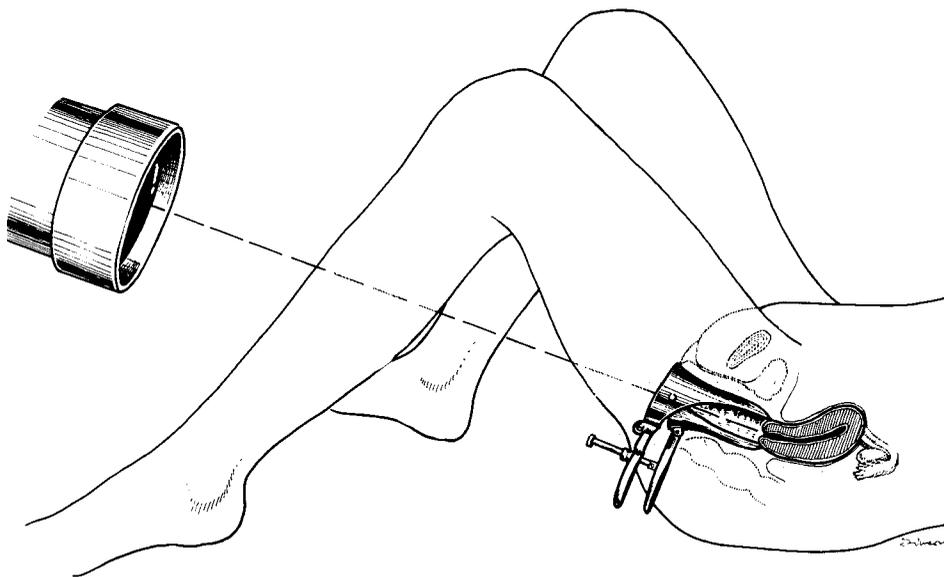


FIG. 1

The thermographic findings were compared with the findings obtained by colposcopy, colpocytology and histology (the latter being obtained by surface biopsy) and expressed as thermal gradients of the abnormal area in relation to the normal surrounding area.

RESULTS

Our thermographic findings show that the uterine cervix (Figs. 2 and 2 a) and the area of benign lesions (Fig. 3) are isothermic, except for a polyp protruding from the cervical canal, which is slightly hyperthermic with a maximum of 1°C (Fig. 4).

The malignant lesions, on the other hand, are markedly hyperthermic, with a gradient which may even rise to $4\text{--}5^{\circ}\text{C}$ (Figs. 6, 7, 8, 9).

The thermographic findings in dysplasia are interesting: they show hyperthermia, although less so than in neoplastic tissue (Fig. 5).

CONCLUSIONS

Although this preliminary study does not allow definitive conclusions because of the limited number of patients involved, the results obtained appear promising.

In all histologically confirmed cases of neoplasia of the portio, the thermographic findings were always markedly positive. It is also of interest that thermographic investigation indicated the presence of dysplastic processes since these are, among the lesions of the uterine cervix, those most carefully checked to obtain an early diagnosis of cervical cancer.

If the subsequent studies now being carried out at our Clinic confirm our present results, we will be able to turn to thermographic exploration as the

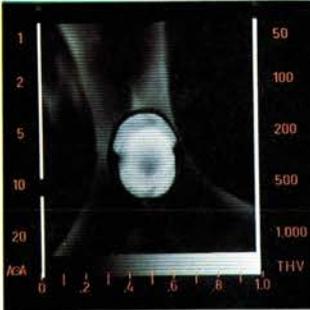


Fig. 2

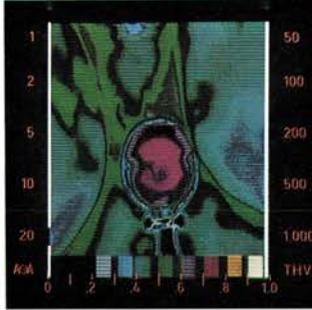


Fig. 2 bis



Fig. 3



Fig. 4

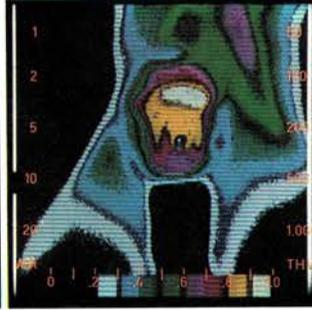


Fig. 5



Fig. 6

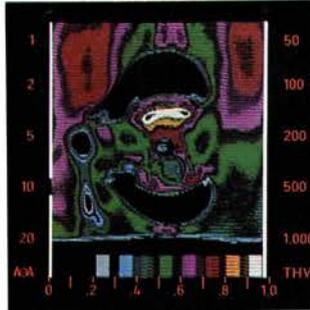


Fig. 7

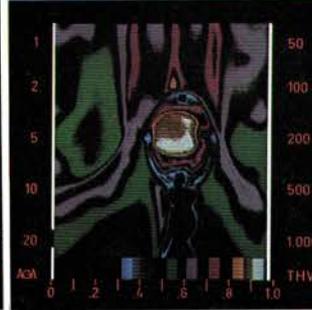


Fig. 8

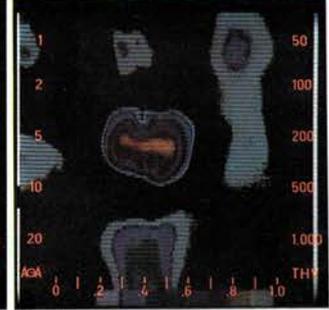


Fig. 9

FIG. 2 - Cervix covered with original mucosa; thermographic examination in black and white. The colder central zone corresponds to the external uterine orifice, centred by the metallic indicator. Heat emission is uniform over the entire squared surface of the cervix.

FIG. 2a - Same as fig. 2, in colour; we note the overall isothermia and the colder central point corresponding to the external uterine orifice.

FIG. 3 - Cervix with peri-orificial ectopia and an area of flat leukoplakia on the anterior lip. The thermogram shows the cervix to be isothermic, with the usual central point, corresponding to the external uterine orifice centred by the colder metallic indicator. We note a slight «cuvette» effect corresponding to the anterior fornix (in white).

FIG. 4 - Cervix with polyp in partial «squamous» metaplasia, protruding from the cervical canal; a slightly warmer circumscribed area ($t^{\circ} = +1^{\circ}\text{C}$) stands out against the overall isothermia, adjoining the metallic indicator (cooler). There is a «cuvette» effect at the site of the anterior and posterior fornix.

FIG. 5 - Cervix with regular dysplasia on the anterior lip. The thermogram shows an area of increased heat emission ($t^{\circ} = +2^{\circ}\text{C}$) which begins with a festooned line at the external uterine orifice, extends to the anterior lip and fades with the «cuvette» effect into the anterior fornix.

FIG. 6 - Epithelioma of the cervix (early infiltration) shown thermographically as a semi-lunar area with hyperthermic spots ($t^{\circ} = +3^{\circ}\text{C}$) to correspond with the left upper quadrant of the cervix.

FIG. 7 - Invasive epithelioma of the cervix; the anterior lip of the uterine cervix appears uniformly hyperthermic ($t^{\circ} = +3^{\circ}\text{C}$) in comparison with the posterior one.

FIG. 8 - Invasive epithelioma of the cervix; the thermogram shows a scythe-form zone with hyperthermic points ($t^{\circ} = +4^{\circ}\text{C}$) which encircles by three-fourths the external uterine orifice.

FIG. 9 - Epithelioma of the cervix with signs of early infiltration. The thermogram shows a pale hyperthermic band ($t^{\circ} = +3^{\circ}\text{C}$) on the anterior lip of the cervix, in contact with the external uterine orifice.

ideal means of deducing cancer of the portio, to be placed alongside those currently used, which are based on entirely different principles.

SUMMARY

The authors report on the preliminary results obtained in a telethermographic study of the uterine cervix. The findings proved encouraging for further studies of this technique in the diagnosis of cancer of the uterine cervix.

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Gas chromatographic studies on certain urinary steroids in obese women

by

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The lack of agreement in the literature, and above all, the absolute lack of analytical data relating to the individual urinary steroid hormones in obesity led us to investigate this aspect of this complex metabolic problem. It must first be noted that most of the results reported by various authors in regard to 17-hydroxycorticosteroid and 17-ketosteroid levels were obtained by the traditional colorimetric method. Further, division of the urinary steroid metabolites merely into the two groups as 17-hydro and 17-keto derivatives is now considered too crude.

Until recently the identification of the individual hormones in each group was not possible because of technical difficulties, but this can now be done by gas chromatography. Consequently, titration of the individual urinary steroids which intervene at some stage in glycolytic metabolism may help to clarify their possible role in the pathogenesis of obesity.

On the basis of this theory we undertook an investigation of the adrenocortical function in a group of obese women.

MATERIALS AND METHODS

The study involved 21 obese women and 11 normal control subjects; the age range of the group was 18-40 years. The obese patients had the clinical characteristics of diffuse gynecoid obesity. No other type of endocrine metabolic pathology was present; hepatic, cardiac and renal functions were normal. During the

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