

**Main Outcome Measure(s):** The outcome was measured based on the accuracy and expediency of the diagnostic procedures.

**Results:** The most frequent problems observed were precocious breast development, precocious pubertal development and asymmetric breasts. Precocious thelarche was observed in 117 patients, four patients were found to have cysts, and there were 59 cases of inflammation or abscess.

**Conclusions:** Liquid crystal thermography and ultrasound proved to be sufficient and accurate means of diagnosis breast problems.

## INTRODUCTION

The aim of our examination was to detect thermoproduction of the breasts, and when it existed, to measure its level and to diagnose its morphological basis. We chose liquid crystal thermography (LCT) and ultrasound (US) as the most suitable modern iconographic methods for diagnosing children. To our knowledge these methods have never been used systematically in young patients by anyone else for this purpose.

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## MATERIALS AND METHODS

From January 1, 1987 to May 15, 1993, we had the opportunity to make 365 examinations in 283 patients who were under the age of 14; during this time the Paediatric Gynaecological Service had a total of 5137 new patients. Thus our study included 5.5% of the patients, specifically those who had breast problems. The majority of the patients were between the ages of 8 and 12. We had two very young patients, both were eight months old. We used liquid crystal thermography and ultrasound in combination only in 47 of the 283 cases. Generally, the use of LCT provides an adequate diagnosis. We made follow-up examinations in 59 patients, one of whom was examined nine times. The number of patients who had a follow-up examination was 0.33% on the total number of patients (18,012) of the Paediatric Gynaecological Service. Examinations were conducted in accordance with ethical standards of the Helsinki Declaration of 1975, as revised in 1983.

The following methods were applied:

### Liquid Crystal Thermography

This is the simplest examination which may be performed on infants and young children. It gives reliable information about the thermoproduction of the breasts and its level. We used our own modification of the Tricore method [3] as a basis for examination of the children's breasts. We examined each patient with discs of various sensitivity, most frequently discs calibrated at 34° or 33 °C which are capable of registering measurements from 34° to 37 °C, and from 33° to 36 °C, respectively.

### Ultrasonographic Examination

This provides useful information concerning morphology. The examination technique is the same as that used in adult breasts. It is most effective to perform the examination by application of a gel pad.

## BASIS OF DIAGNOSIS

### Disc Thermography

Our own experience [1] as well as data in the literature [2] show that the source of the increased heat production is increased cell activity which can accompany an increase in blood supply. Thus the most serious diseases connected with heat production are:

malignant tumour, giant fibroadenoma, inflammation of the breast, abscess, and the onset of precocious puberty.

Disorders connected with reduced heat production are:

benign tumour (possibly colder than its environment), obesity, and the silent period of precocious puberty.

The source of reduced heat production is obvious by that mentioned above.

## ULTRASONOGRAPHY

### Cystic deformations

Simple contour, echo-free content, "tadpole-tail sign": cysts, abscesses.

### Solid deformations

Uneven contour, non-homogeneous content: malignant tumour.

Simple contour, homogeneous content: fibroadenoma.

## CASE STUDIES

1. S. W., age 10. Both breasts are swollen and sensitive to pressure, but no distinct node is palpable. Clinical diagnosis: onset of breast development. LCT: Both breasts have increased heat production (Figure 1).

2. V. C., age 10. The right breast is swollen and painful, but the size of the left breast is appropriate to the child's age. No distinct node is palpable. Clinical diagnosis: precocious puberty. LCT: The heat production of the right breast is increased, but the left breast is cold (Figure 2).

3. E. W., age 12. The left breast is swollen and sensitive to pressure, but the right breast shows no heat production. Clinical diagnosis: onset of puberty. LCT: The heat production of the left breast is greatly increased, but the right breast is cold (Figure 3).

4. E. H., age 13. A large node which is not sensitive to pressure formed in her left breast within a few weeks. Clinical diagnosis: juvenile fibroadenoma. US: Widespread, simplecontoured solid deformity of homogeneous structure with a weaker echo than its environment. LCT: Above the node the vascularity is greatly increased. Excised: Giant fibroadenoma (Figures 4a, 4b).

5. A. P., age 13. The left breast is painful and solid, and above this compact region the skin is reddened. Clinical diagnosis: breast abscess. US: A cystic objects in the left breast. LCT: Increased heat production is present, confirming the clinical diagnosis.

Repeated examination one week later: The node diminished in size after antibiotic therapy, and the clinical signs improved significantly. US: The cystic deformity is reduced. LCT: The level of heat production is also

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