Infrared thermography in Iran

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SUMMARY. Thermography started in Iran in 1973. There is only one Centre of thermography in Iran functioning at the Medical Centre (Reza Pahlavi Hospital) in Teheran. 0ur experience is limited to mammary thermography. Up to now, we have performed thermography on more **than 1500 patients. Thermography is always performed in optimal conditions. We have studied a homogeneous group of Social Security patients totalling 630 in whom we have found 94 benign and 30 malignant lesions. The cancerous patients age is according to our statistics, identical to that of western women.**

The experience has shown that: 1. Thermography is one of the indispensable elements in a Senological Centre, that has helped us to give a correct diagnosis in difficult cases before intervening; particularly a case of breast necrosis after excochleation and replaced by a silicone prosthesis and another 20-year old patient for whom a gynecomastia had been diagnosed for one year. **2. We have found cancers even clinically obvious in hypervascular or completely avascular breast; for this reason we attach importance to any vascular asymmetry. 3. Up to now, we have not found specific thermographic signs to differentiate the benign from the malignant lesions. For we have seen all the thermographic patterns in benign or malignant tumours. 4. We bave seen vascular asymmetry of either of the hyper-or hypo-vascular type, or** in the so-called « sclerosing adenosis » or mastodynia for which the real pathogenic meaning is unknown. **5. Full judgement of the thermographic pattern of breasts cannot yet be made and the real value of breast thermography not yet ascertained requires more work and research.**

Key words: thermography, history, vascular asymmetry, bening and malignant lesions.

We commenced infra-red thermography in Iran in 1973. At present there is only "one thermographic Centre in Iran which is functioning in Reza Pahlavi Medical Centre. We have at our disposal two kinds of equipment, one is the Swedish AGA 680 and the other the American Spectrotherm 1000. Our experience is limited to mammary thermography. The procedure is always performed under appropriate conditions in an air-conditioned room of 20 °C. The patient is cooled for 10 to 15 minutes before examination.

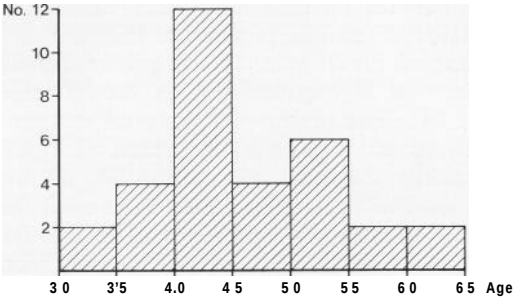
Thermography always follows clinical examination and precedes mammography. The number of patients tested by this method has reached now the 1,500 limit. From this number about 630 patients have been analysed for this report. In this homogenous group of patients, there were 94 patients with benign and 30 patients with malignant lesions. The distribution of lesions is as follows:

Benign Lesions

Non puerperal abcess	5
Puerveral abcess	10
Solitary cyst	15
Multiple and bilateral cysts	9
Hydatid cyst	1
Tuberculosis	1
Diffuse fibrocystic disease	27
Fat necrosis	
Silicon prosthesis necrosis	
Circumscribed fibro adenomata	18
Galactocoel	3
Infected galactocoel	2
Plasma cell mastitis	
Total	94

Histological distribution of carcinoma

Infiltrative	22
Cylindroma	-
Inflammalory	3
Medullary	2
Comedo	2
Total	30



Graph 1. Age distribution of carcinoma.

Age distribution of carcinoma

According to our findings the age at which breast carcinoma is discovered in Iran is the same as it is in western women (Graph 1).

The method adopted for interpretation of thermography is simple and is based mainly on our personal experience and the radio-clinical context. We concern ourselves only with thermographic asymmetry.

Two difficult cases seen by us will be presented here for special interest.

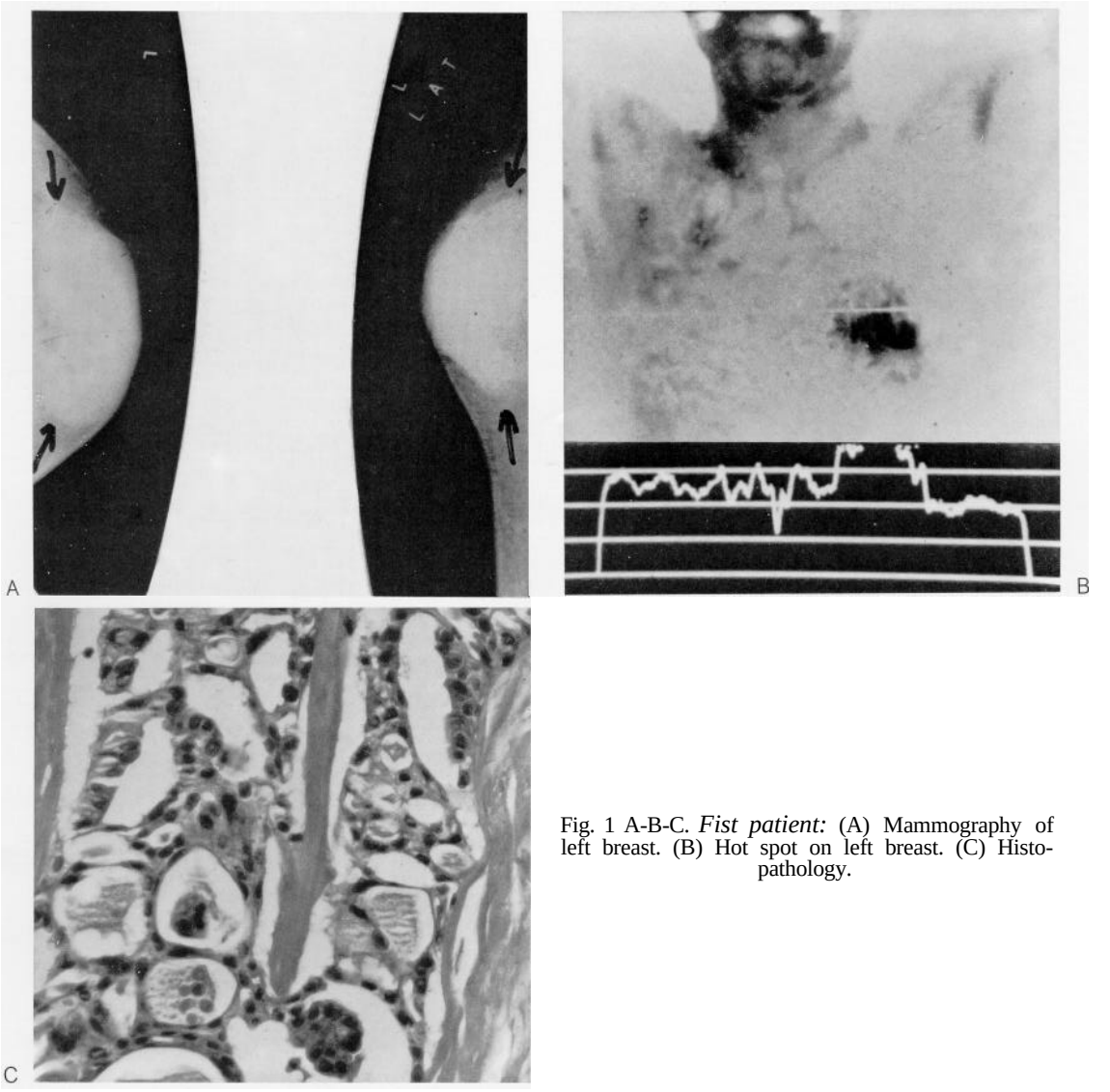


Fig. 1 A-B-C. *Fist patient:* (A) Mammography of left breast. (B) Hot spot on left breast. (C) Histopathology.

First patient

A young, athletic looking patient, 20 years of age, felt some masses under both nipples of one year duration (Fig. 1A). He was considered clinically to have bilateral gynecomastia, but thermography showed hot-spot on the left breast (Fig. 1B). With this suspicion of malignancy a biopsy was performed and proved to be a carcinoma of cylindroma type (Fig. 1C).

Second patient

This was a patient with bilateral subcutaneous mastectomy and replacement by silicone prosthesis for bilateral fibrocystic disease performed five months previously. Patient referred for left breast pain. Thermography showed increase of hyperpascularity on the left side (Fig. 2A). The patient was seen on different occasions and each time the increase of hypervascularity was more evident (Fig. 2B). At this time the finding was enigmatic to us until the process of necrosis supervened (Fig. 2 C-D). However, now retrospectively, it is our opinion that thermography will enable us to foresee the gradual inflammatory process long before the necrosis sets in.

Since the first results obtained by Lawson

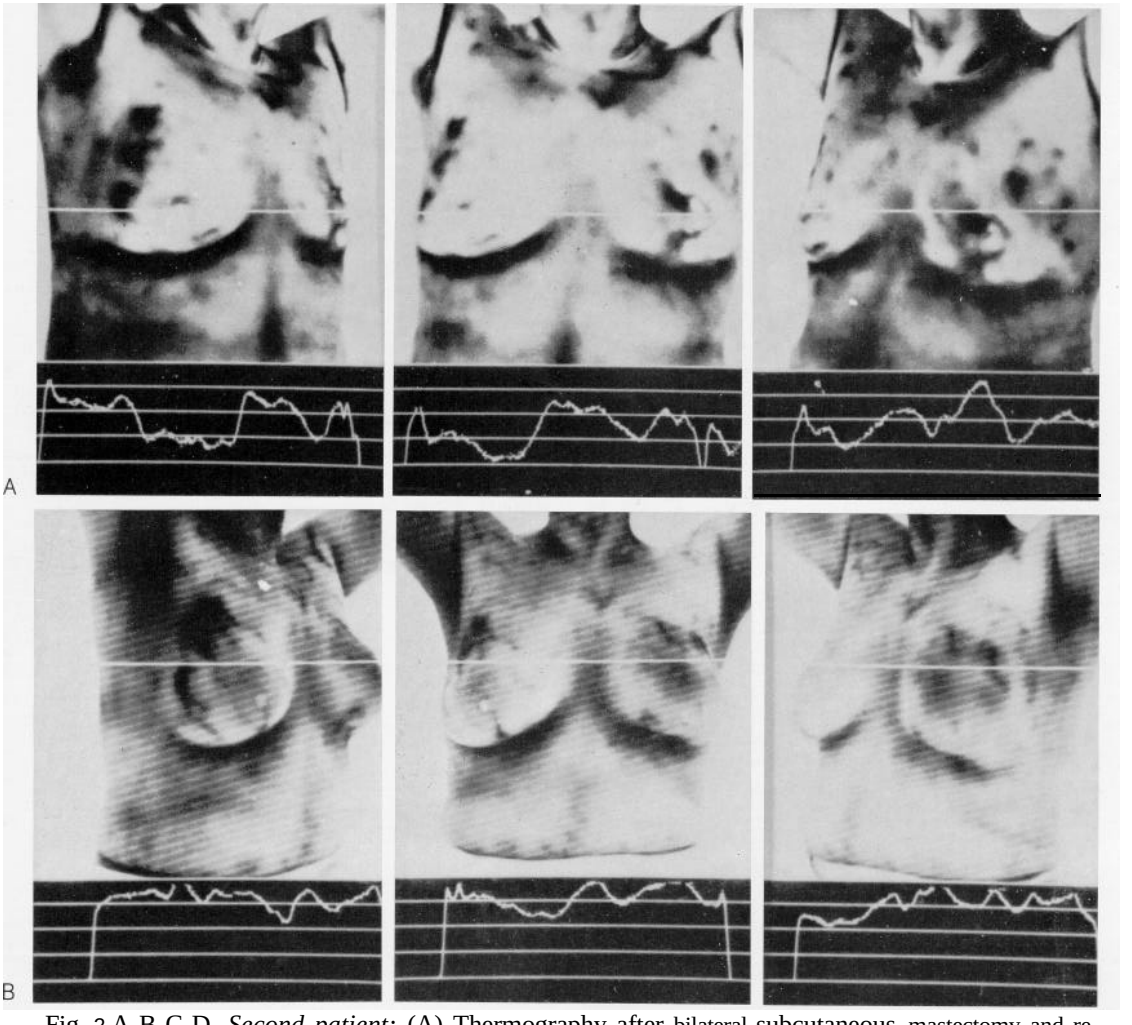


Fig. 2 A-B-C-D. *Second patient:* (A) Thermography after bilateral subcutaneous mastectomy and replacement by silicone prosthesis. (B) Three months later-beginning of the necrosis on the left breast. (C) Necrosis. (D) After removal of silicone prosthesis.

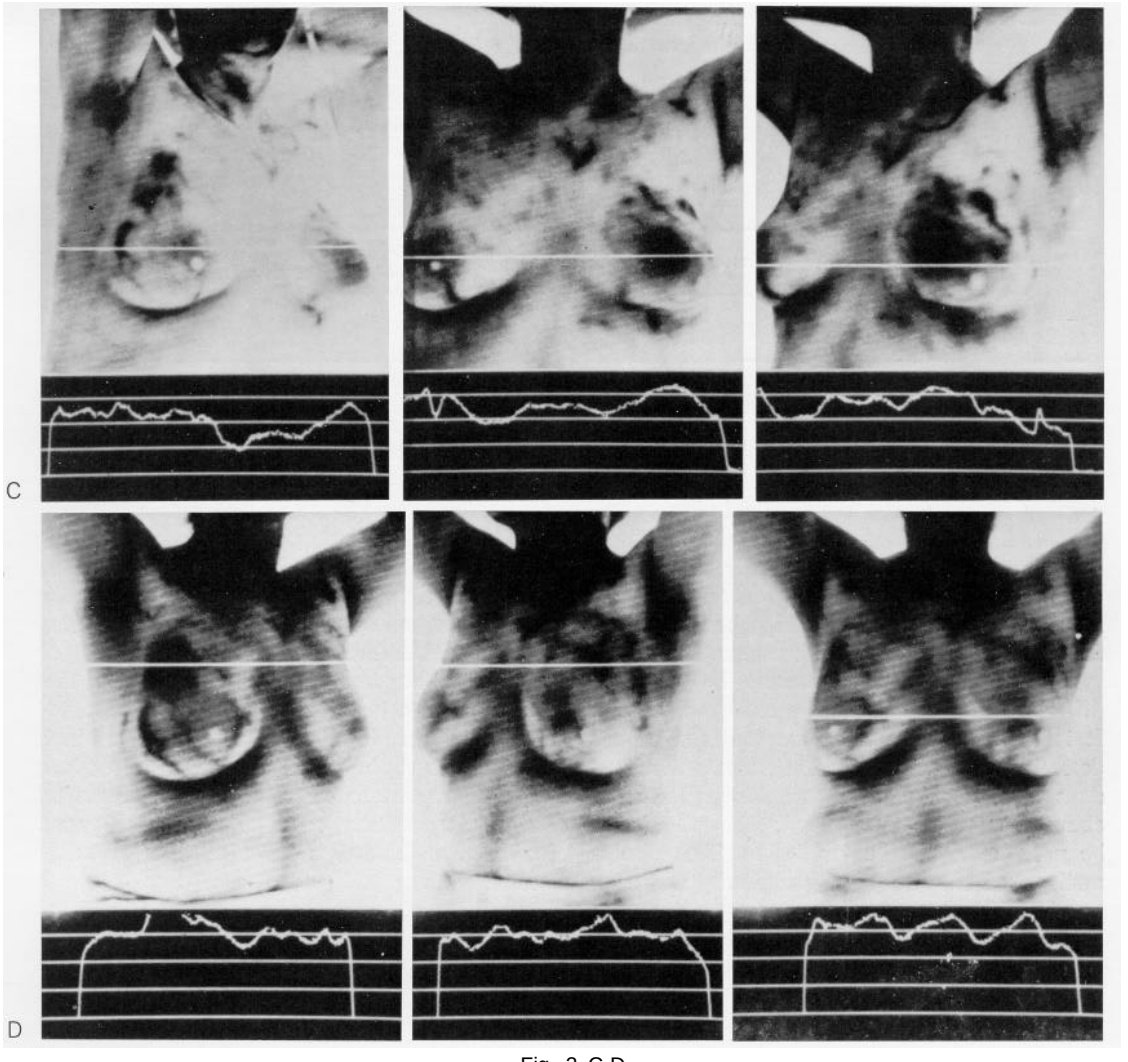


Fig. 2 C-D.

in 1957, thermography has sustained an unwarranted enthusiasm. Based on this initial optimism some investigators believed all kinds of breast cancer could be detected by this harmless method. From the beginning much emphasis has been laid on the various aspects of hypervascularity, and different nomenclatures are based on hypervascularity and hyperthermia. However, a high percentage of false negative and false positive on one hand, and the obvious avascularity of the frank breast cancer on the other hand, led us adopt a very simple nomenclature for thermographic interpretation.

We attach importance not only to hypervascularity but also we look with special interest upon the unilateral hypovascularity or avascularity. Such asymmetry may be indicative of a pathologic process, benign or malignant. However, this asymmetry can be avascular, hypo or hypervascular. This hypervascularity might be local, diffuse or periareolar. In our study thermography has not been able to aid us in differentiating benign from malignant lesions.

The results on 94 benign and 30 breast carcinoma are presented in the following table (Table I).

As is obvious from the preceding table all kinds of thermographic signs may accompany benign and malignant processes. But at the same time such changes can be seen in physiologic state, such as pregnancy or in contraceptive pill users. We believe that the addition of thermography to the physical examination, mammography and xerography considerably increases the diagnostic index of accuracy. The thermographic pattern is not a specific phenomenon of cancer. It actually increases in any abnormality of breast metabolism. This may explain the high percentage of false-positives in most explorations.

Breast thermography cannot be used to differentiate a benign from a malignant lesion. It is therefore an inaccurate tool for cancer detection alone. Many breast cancers will produce an abnormal thermographic pattern. An abnormal pattern, however, is just as likely to be produced by a benign lesion. This abnormality if focal (hot-spot), originally was thought to be diagnostic of carcinoma, but actually is seen twice as frequently in benign lesions. An asymmetric venous pattern is the most common abnormal pattern seen with carcinoma. However, an asymmetry in venous pattern is seen with benign lesions as well.

Tab. I. **Thermographic pattern.**

	Lesions No. of patient	*Isovascular*	*Hypervascular*	*Hypervascular> 2" C*	*[illegible] scular*	*Avascular*
Benign	*94*	6	*76*	*4*	*5*	*3*
Malign	*30*	*3*	*21*	*3*	*1*	*2*

The asymmetry found in thermography must be taken only as a clue leading to further investigation of the eventual pathologic process.

Often we have encountered vascular asymmetry, be it hypervascularity or avascularity, in so called sclerosing adenosis and also in unilateral mastodynia. The mechanism of the thermographic finding is unclear to us.

It is to be concluded that it is still too early to judge the value of breast thermography. However, it can be said with certainty that thermography is only an adjunct to other available means leading to further increase in diagnostic accuracy, and it leaves much room for further investigation to assess its diagnostic value.