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Thermal Imaging -- The Paradigm Shift

Inappropriate Training

By William Cockburn, DC, FIACT

Because thermography is a noninvasive (no radiation) procedure, there is no specific legislation or regulatory act under which thermography can be scrutinized. Early thermographic pioneers created entrepreneurial training and certification programs for both physicians and technicians. These programs cultivated a host of new course instructors and a variety of organizations and certifications became available. Some courses offered thermographic certifications to people with no health care training at all. For example, injured workers could qualify under vocational rehabilitation laws to become certified and open their own labs. They found any doctor who was willing to read their studies, and few of those doctors were trained or certified in thermography.

The result was a deluge of poor studies, poor interpretation and varying degrees of protocol standards. This has subtly contributed to much of the so-called "false positive" literature. College-based programs, such as the one I formerly taught, are required to insure the quality of study necessary in today's medical climate.

Inappropriate Equipment

There are essentially two types of thermographic equipment utilized in chiropractic: liquid crystal thermography (LCT), and electronic or camera operated thermography. Both of these procedures are valid and have their respective places in diagnosis.

However, many manufacturers modified thermographic equipment utilized for night vision or military application. Some of these detectors are not of adequate quality to read patterns from human skin. Unaware physicians who desired to use thermography in their practice, purchased scanners and detectors which gave them inconsistent or false positive findings. To further complicate this issue, many manufacturers came up with "slick" software programs that resulted in very impressive looking, yet inaccurate, studies.

Physicians and technicians who operated such equipment, and as a result gave up their faith that thermography was valuable, admitted that they always felt something was not right about their studies and felt badly about abandoning the procedure.

As with any medical technology, the appropriate application of the technology with the correct equipment performed to a consistent protocol by board-certified individuals will result in more accurate yields and satisfactory scientific compliance.

Lack of Regulation

A hallmark in the downfall of thermographic procedures is the fact that no authoritative thermography regulatory board exists in the United States.

While the FDA, the Council of Scientific Affairs of the American Medical Association, the ACA, and the ICA provide proactive policies and statements about thermography, there is virtually no regulation of the procedure. Some state licensing boards for medicine and chiropractic for example, have incorporated various standards and medical necessity guidelines for utilization of thermography, but that is about all.

Anyone can own and operate thermographic equipment. Only licensed health care providers with portal of entry status (primary health care license, MD, DC, DDS, DPM, etc.) are allowed to interpret or make diagnoses of thermographic examinations (see "Inappropriate Training" above). In addition, the above caveat also refers to the ability to bill an insurance carrier and receive payment for services. Thus, entrepreneurs with no formal medical training often sought out and "cut" deals with untrained physicians to read exams just so they could bill an insurance carrier. With this type of unprofessional conduct, a great many badly performed studies found their way into the materia medica and the court system. (See "Personal Injury Model" below)

While many state boards have approved continuing education seminars for certified relicensure hours in thermography, as well as approving board certification programs, I feel that state mandated regulations should be implemented to insure quality control of the procedure. This would not necessarily require separate and fiscal intensive new boards, but could be made the responsibility of existing licensure boards.

Improper Protocol

A major factor in the inconsistency of published works in the thermographic imaging field is the various protocols under which the procedure is performed. Although not difficult, the protocol of the examination, as with x-ray or any other diagnostic device is essential to accurate and reliable study. Examples of thermographic protocols would be: the ambient room temperature at which the examination is performed; the determination of whether the patient has a fever or not at the time of the examination; the type of equipment utilized; the type of floor covering; the presence of windows which allow outside heat to unevenly permeate a room; and the type of window coverings utilized.

When I taught the diplomate program in California for thermography, physicians were asked to submit thermographic studies for review. The vast majority of unacceptable studies (which were used for diagnosis in these clinician practices), were found to contain errors created by poor protocol that were extremely inexpensive and simple to correct. Protocol is everything. Without an established protocol, no comparison of accuracy, double blinded study or evaluation of the procedure and its effectiveness can be made.

Personal Injury Model

An additional and very important factor in the current status of thermography has been its role in personal injury and workers' compensation litigation. As a test of neurophysiology, thermography is unparalleled in its reliability to detect spinal trauma, nerve injury, muscle imbalance and a myriad of other conditions such as the controversial reflex sympathetic dysfunction associated with permanent trauma.

Recognizing the tremendous threat that thermography posed in the form of skyrocketing jury award in trauma/injury cases, the insurance industry declared an all out war on the procedure. Using so-called experts, they picked the procedure apart based on poor studies, innuendo, material out of context, and ripped apart the testimony and diagnosis of unsophisticated and untrained physicians who used the procedure strictly as a means to more practice income. This led to lack of insurance coverage, difficulty for trial lawyers to get thermography admitted into evidence, and the abandonment of the procedure nationwide by physicians who could no longer "get paid for it"!

It is ironic that thermography as a diagnostic tool was so potentially lethal to the auto insurance industry that its diagnostic significance was so easily disregarded due to the damaging effect of deep pockets awards to injury victims.

Anecdotal vs. Scientific Evidence

With the above concepts in mind, it is very important to differentiate scientific fact for anecdotal evidence. For the purposes of this presentation I define anecdotal to mean a myth or a fable not supported by the fact, but accepted because of a common belief or usage.

Many physicians, investigative journalists, and trial lawyers use anecdotal data to support their point of views. An example of this is the often published article in the medical journal that uses 10-20 references by other authors who all have just rewritten an original thesis or premise in order to get published.

Now the materia medica has a number of consistent articles or studies which appear to be powerful when used as an argument for or against a given procedure. In reality, anecdotal evidence is disastrous when not recognized. Thermal imaging is pure science. While prone to misinterpretation by untrained clinicians, its diagnostic accuracy and yield are unparalleled in medicine.

The scientific study and reporting on a world wide basis is overwhelming. Yet for the facts presented previously, mainly financial, the procedure is being abandoned in the United States, save for a handful of very dedicated physicians who see the clinical benefits of thermography for their patients on a daily basis, whether they get "paid" for it or not.

Competition Paradox with Mammography

This is a great irony and source of confusion in medicine. Another antagonist of thermography is the medical radiology community. Many radiologists I have spoken to fear that their investment in mammography equipment will be wasted because they view thermography of the breast as competitive with mammography. This is a classic example of the lack of training and anecdotal arguments I have previously presented.

Mammography is anatomical, and thermography is physiological. One cannot compare apples to oranges. The procedures are complimentary, not competitive. The same holds true for MRI and CT compared to thermography for musculoskeletal conditions.

Rather than hiding behind innuendo and anecdote, radiologists need to understand the tremendous potential of thermography to detect the physiologic manifestation of disease that so often predates the anatomical analysis of same.

The "school of medicine doctrine" in law is relevant here. The AMA originally sent requests for evaluation of thermography to radiologists who were not trained or certified in the procedure instead of to the Council on Scientific Affairs. The radiology bias, or lack of information, created a negative position which exists today.

Conclusion

This brief paper has been aimed directly at the heart of the thermography paradox. Lack of training and certification accompanied by the massive insurance industry attack on the procedure has created its own set of false positives.

These false positives are in the belief and value structures of a procedure which has one of the highest sensitivity and specificity ratings in diagnostic practice and is completely reliable when performed for the right reasons and in the correct protocol.

To reinforce the appropriate level of training and to shift the paradox, we must understand simply, that we are not diagnosing conditions with thermography. In the same way that thermography cannot see cancer, it cannot see nerve or muscle. It can, however, determine the physiologic presence of abnormality associated with these anatomically-based factors.

Thermography is adjunctive, reliable and should be used whenever possible to help patients receive the best analysis of their condition and the best treatment directed at that condition.

Low Resolution Thermogram: The two thermograms above represent low resolution electronic thermography of the female breasts and upper torso. These views utilize a 10 degree window with color blocks approximating 1 degree centigrade per color. Although several additional thermal abnormalities exist, it is clear that the thermogram on the left represents healthy temperature and symmetry of the breasts. The image on the right is a highly abnormal thermogram with intense heat abnormality consistent with tumor neogenesis in the right breast. This is demonstration of breast abnormality physiologically and must be further evaluated with clinical testing, mammography and physician monitoring.

High Resolution Thermogram: The above thermograms are high resolution, often referred to as linear or black and white imaging. The symmetry in the patient on the left versus the asymmetry in the breasts of the patient on the right are much clearer than the resolution displayed in the two color thermograms above. These images are of the same two patients.

While mammothermography cannot identify breast cancer, it does provide the safest and earliest risk marker available. Due to the non-invasive aspect of thermography, this procedure provides reliable and accurate data about the physiologic state, not the anatomic state of human breast tissue.

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About the author: William Cockburn, DC, FIACT, of Whittier, California, has been appointed by the American Board of Medical Infrared Imaging as co-chairman of a national study to determine if thermographic imaging of the breast will be useful as an outcome assessment tool in patients with breast implants. William Hobbins, a thoracic surgeon from Madison, Wisconsin, will co-chair the committee with Dr. Cockburn.

The study will do thermographic examinations of women in three categories:

1. asymptomatic patients with breast implants;
2. symptomatic patients with breast implants;
3. patients who have had breast implants removed.



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