Title
Beware the pseudo guinea worm!

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Authors
Farooki, S
Seeger, LL
Gold, RH

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one of our mammography sites had switched to MIN-R 2000 film (Kodak, Rochester, NY). Until reading this article, I was unable to obtain any guidance with regard to this artifact.

I hope that this article will prompt the film manufacturer to rectify the problem or at least to inform users that there is a problem that can be fixed by paying attention to which side of the film is placed down in the processor.

Reference

1. Hedrick WR, Poulton TB, Starchman DE, Tobias TE. Unusual artifact with mammography film. Radiology 1998; 206:835–837.

Beware the Pseudo Guinea Worm!

From:

Shella Farooki, MD, Leanne L. Seeger, MD, Richard H. Gold, MD

Department of Radiological Sciences, University of California at Los Angeles School of Medicine

200 UCLA Medical Plaza, Suite 165-59, Los Angeles, CA 90095-6952.

Editor:

A 65-year-old woman was referred for a radiographic examination because of a 1-year history of left hip and knee pain. Radiographs revealed extensive calcification-like, punctate opacities projected over the soft tissues of the left buttock and thigh (Fig 1). The opacities were distributed linearly, an appearance characteristic of the calcified guinea worm, *Dracunculus medinensis* (Fig 2). Because the patient had a history of extensive travel in Egypt, a diagnosis of dracunculiasis was considered.

Several weeks later, a radiograph of the abdomen of a 2-month-old male infant revealed similar opacities projected over the abdomen, as well as beyond the lateral abdominal wall. By questioning the technologist, we learned that iodinated contrast material (Hypaque-76 [diatrizoate meglumine and diatrizoate sodium injection], Nycomed, Princeton, NJ) had been spilled on the mat covering the radiographic table. A radiograph of the mat (Fig 3) revealed linear opacities identical to those in the radiographs obtained in both patients. Although attempts had been made to clean the mat, residual contrast material remained within clefts of the plastic surface.

Dracunculiasis, or guinea worm disease, is a potentially disabling infection caused by *D medinensis*. It is endemic to the Nile Valley, central and western Africa, India, Pakistan, Iran, and other parts of the Arabian peninsula. Infection occurs with the ingestion of water contaminated with larvae, which eventually migrate to the subcutaneous tissues. There, the female larvae become mature worms, mate, and expel their larvae through the skin. If a female worm dies before reaching the skin surface, it may calcify within the subcutaneous tissues. Calcification is the usual fate of the male worm

Figure 1. Lateral radiograph obtained in a 65-year-old woman shows extensive linear opacities projected over the soft tissues of the thigh.

Figure 2. Collimated posteroanterior radiograph of the hand of a patient with documented dracunculiasis.

Figure 3. Radiograph of the mat covering the radiographic table demonstrates linear opacities that can be exactly superimposed on those in Figure 1.

(1,2). The radiologic finding of a calcified guinea worm is common in endemic areas, and there have been anecdotal reports of calcified guinea worms in radiographs obtained in patients in the eastern United States (2). It has been reported that 89% of patients who were found to have calcified guinea worms were asymptomatic (2).

Artifacts are commonly encountered in radiographic images, and their recognition is an essential part of radiologic diagnosis. Under most circumstances, their cause is readily apparent, and their unimportance is understood. As in our case, however, an artifact may closely simulate human disease and lead to an incorrect diagnosis. When rare or unusual soft-tissue "calcifications" are encountered, it is prudent to consider the possibility of contamination with radiopaque material on or in mats, positioning devices, or the equipment itself.

References

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2. Muller R. *Dracunculus* and dracunculiasis. In: Dawes B, ed. Advances in parasitology. New York, NY: Academic Press, 1971; 73–140.

Cost of PACS and Computed Radiography in the United States

From:

André J. Duerinckx, MD, PhD,* Edward G. Grant, MD†
Radiology Service, Mail Route W114, Magnetic Resonance Imaging Clinic, Building 507,
West Los Angeles Veterans Affairs Medical Center
11301 Wilshire Boulevard, Los Angeles, CA 90073*

Department of Radiology, University of California
Los Angeles Medical Center, CA 90095†

Editor:

I read with interest, but great concern, the article by Pratt et al in the January 1998 issue of *Radiology* (1). I believe that the authors' conclusion that full picture archiving and communication system (PACS) and computed radiographic (CR) implementation would not provide cost savings for a large subspecialized department can be misleading to our radiology community. Both our group (Duerinckx et al [2]) and Pratt et al (3) presented a cost analysis of a full PACS-CR implementation during the 1997 Society of Photo-Optical Instrumentation Engineers–, or SPIE-, sponsored International Symposium on Medical Imaging in February 1997 in Newport Beach, Calif. We performed a cost analysis for a PACS-CR system with a teleradiology network connecting four major veterans affairs medical centers and several large clinics in a Veterans Integrated Service Network in Southern California. Our Veterans Integrated Service Network–wide cost analysis included an evaluation of incremental costs of department-wide implementation of a PACS and CR system in individual hospitals. Specifically, we performed a detailed cost analysis for the West Los Angeles Veterans Affairs Medical center, a tertiary Veterans Affairs referral center, with 500 medical-surgical beds and an additional 700 nursing home and psychiatric beds. About 120,000 radiologic studies are performed per year at our center. Pratt et al never stated the number of beds and procedures performed per year.

Our cost model was very similar to the one presented by Pratt et al in the January 1998 issue of Radiology. We also determined all capital and operational costs associated with PACS-CR implementation. The economic effects were identified, adjusted for time value, and used to calculate the net present value of a PACS-CR system for the whole department. The yearly net present value, which starts out as a negative value, indicates how much the PACS-CR system has cost the radiology department up to that year. It is hoped that after a number of years of semifilmless operation, the net present value of a PACS-CR system becomes $0 and then later becomes positive, indicating a net profit. Because we made different assumptions about the gradual implementation of our PACS-CR system and its base cost, our conclusions are different (4).

First, the total cost base of our PACS was only U.S. $2.8 million, unlike the $9.2 million assumed by Pratt et al. This is one of several substantial differences in the two models. It is important for the readers of *Radiology* to realize that one does not have to spend close to $10 million to have a workable PACS-CR system. The cost of individual CR units and digital chest units has substantially decreased to the point where $2.8 million will be adequate to cover most moderately sized hospitals.

Second, we assumed that we would achieve an 80% reduction in the use of film for chest radiography, bone imaging, and fluoroscopy within 4 years, as opposed to the 90% reduction within 8 years in the model by Pratt et al. We could take this difference one step further and for a moment assume that an 80% film-use reduction could be achieved within 1 year, which, although unrealistic, will help clarify our point. The change in net present value for both scenarios, a 4-year versus a 1-year transition to 80% filmless operation, is shown in the Figure. Our model assumes that half the radiographic studies are performed with CR units and half with direct digital chest units. The graphs are for a $2.8 million base cost, with 5-year amortization (with a 5% yearly discount rate but without interest payments, as it is a federal government facility).

If there is an 80% reduction in film use within the 1st year, then the net present value decreases during the first 5 years down to −$1.75 million before it starts to increase. This is because the yearly amortization cost ($756,000) is greater than the yearly projected savings ($529,560). After 5 years, the equipment has been paid for and the net present value increases to reach $0 after 3 years before it becomes positive (curve for 1 year in the Figure). This differs from the case in which the 80% film-use reduction is gradually achieved over 4 years (curve for 4 years in the Figure). When a PACS-CR system is in place and less than 80% film-use reduction is achieved, the net present value decreases much more during the first 5 years, down to −$2.49 million, before it starts to increase. It then takes the net present value slightly more than 4 years to become $0 (curve for 4 years in the Figure).

Although one could conservatively interpret this as meaning that it took 7–9 years for the PACS-CR system purchase to pay for itself, there is another way of looking at these data. If