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## Medical Malpractice in Diagnostic Radiology: Claims, Compensation, and Patient Injury<sup>1</sup>

The purpose of this study is to provide more information to diagnostic radiologists regarding claims, compensation, and patient injury in medical malpractice cases. Malpractice cases filed against the U.S. government were reviewed. The most common claim was misdiagnosis of a malignancy (30% of the cases); in these cases the claimants received relatively high compensation. Most of these cases involved failure to diagnose lung carcinomas on chest radiographs and failure to diagnose colon carcinomas on barium enema studies. The findings emphasize the importance of having the members of a radiology department, regardless of professional level, work together as a team.

**Index terms:** Medico-legal problems • Radiology and radiologists

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**I**N Cook County, Illinois, between 1975 and 1980, 15% of all malpractice cases involved radiology, the rate rising to 21% at the end of the 5-year period (1). Most suits involve "missed" diagnoses (1). In previous studies, failure to diagnose fracture or dislocation was the leading malpractice claim against radiologists, with failure to diagnose cancer second (1, 2). To our knowledge, no study has shown failure to diagnose a malignancy to be the most common claim against radiologists. In addition, little or no information exists on the types of patient injury, the percentage of settlements versus court judgments, and compensation. In an effort to provide practical information in these areas, we reviewed the types of claims and the compensation paid to claimants and litigants and identified the injuries they sustained in these cases.

### MATERIALS AND METHODS

We reviewed 1,214 medical malpractice claims filed under either the Federal Tort Claims Act or the Military Claims Act against the U.S. government between October 1981 and February 1985. In-depth analysis revealed 70 cases with radiologic involvement, considered to be present if (a) a diagnostic radiologist was identified as the malfeasant; (b) reference was made to radiologic studies, including nuclear medicine; or (c) a radiology department played an important role in patient care. Cases were excluded if (a) they were resolved by the patient and the physician privately before consultation with the Department of Legal Medicine, (b) a non-radiologist failed to order a radiologic study, or (c) the cases involved radiation therapy or cardiac catheterization, so that diagnostic radiology and studies commonly performed or interpreted by radiologists would be emphasized.

The claims were filed by retired military personnel, their dependents, and dependents of active duty personnel both in the United States and overseas. Active duty personnel are precluded by law from filing negligence claims against the

U.S. government. Therefore, no data are available for that subpopulation.

### RESULTS

During the 40-month period, approximately 6% of all claims involved diagnostic radiology.

#### Claims

A malpractice claim arises when a patient believes that improper medical care has resulted in bodily harm. Malpractice or professional negligence occurs if the physician fails to follow the standard of care, that is, breaches his or her duty to the patient. Liability arises when the negligence is a proximate cause of injury.

An error in the interpretation of a radiograph<sup>2</sup>, including misdiagnosis<sup>3</sup> or failure to diagnose, is an example of a general type of claim in radiology. Negligence in misdiagnosis is ascertained if the medical problem is apparent from the image. The cases reviewed here did not have ambiguities or circumstances that would readily explain the failure to interpret the radiographs properly.

The three main categories of claims—misdiagnoses, complications, and miscellaneous—are shown in Table 1 along with the corresponding final compensation paid to claimants.

The most common claim category was misdiagnosis (67% of cases), of which the most common type was failure to diagnose a malignancy (30% of cases). Most of these cases involved failure to diagnose lung carcinomas on chest radiographs and failure to diagnose colon carcinomas on barium enema studies. The data show that the compensation for this subcategory is high (median, \$162,000). Misdiagnosis of a fracture or dislocation, on the other hand, represented only 13% of the cases, with a median compensation of \$6,500.

The second most common claim

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<sup>2</sup> The interpretation of radiographic images has several components. One is perception of features (detection); another is the decision about the diagnostic relevance of these features (cognitive process) (3).

<sup>3</sup> Misdiagnosis occurs when (a) the physician fails to discover a patient's disease (false-negative study) or (b) the physician tells a patient who is free of disease that he has a condition from which he does not actually suffer (false-positive study) (4, p. 71).  
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category was complications (14% of cases), most commonly occurring during angiography. The data show that the compensation for complications is also high (median, \$217,000).

The third claim category was a miscellaneous group of claims. The most common type of claim in this category was failure to inform a clinician promptly of urgent information (9% of cases).

One additional observation regarding claims is that 82% of the cases involved radiologists and radiology departments, while the remaining 18% involved nonradiologists who were responsible for interpreting radiologic studies. The compensation in both groups was similar.

### Compensation

Compensation is the amount of money paid to claimants as the result of a settlement or a court judgment. Fifty-nine percent of the cases were settled prior to litigation; in 4% of the cases payment was the result of a court judgment, giving a total of 63% of cases resulting in compensation. Compensation ranged from \$0–\$1,000,000, with a median of \$57,500. Seventeen percent of the claims were withdrawn for various reasons. The remainder were not litigated after they had been found to be nonmeritorious and denied at the administrative level. Twenty percent of the cases are pending settlement or trial. (February 1986 was chosen as the end of the data collection period for compensation results, since some of the cases may be in the litigation process for several years to come.)

There are advantages and disadvantages to both trials and settlements that make one more practical than the other, depending on the circumstances of the case. For example, a settlement is an alternative to the costs of defending a case in court. There may have been factors, such as poor records, that made defense in court difficult and settlement more realistic.

### Patient Injury

The types of injuries experienced by patients are summarized in Table 2. The corresponding final compensations are also listed in this table. Table 3 compares patient injury with the claims.

The patients were classified by type of injury sustained. The most frequent injuries were death (14 cases), loss of chance for survival (17

cases), and permanent disability (17 cases). The compensation for permanent disability, most commonly associated with a complication, was high (median, \$317,000). Negligent failure to diagnose a malignancy usually resulted in decreased probability of the patient's survival. There were 13 instances in which the injury was temporary or associated with only minimal disability or pain and seven instances of negligent failure to diagnose a malignancy but not associated with a significant change in life expectancy (relatively low compensation). There was one case each of fetal death, intrauterine injury to a fetus in early gestation (compensation, \$1,000,000), and an unwanted pregnancy in a patient whose intrauterine device perforated her uterus.

### Risk Management

Risk management suggestions were made in several cases, including the proper use of pharmaceuticals and contrast agents, preventive maintenance of radiologic equipment, training of personnel, and proper labeling of films. For example, in one case a film changer jammed during a cerebral angiography examination in which the technicians were unfamiliar with the equipment. The length of the procedure was therefore extended to 3 hours, during which time the patient had a stroke.

### DISCUSSION

In this study, approximately 6% of the medical malpractice cases reviewed had radiologic involvement, compared with 15% in the study by Berlin (1). Some of this variation may be explained by a difference in the criteria used for defining radiologic involvement. We excluded radiation therapy cases and the cases in which there was failure to order a radiologic study, categories that Berlin included in his review. Part of the difference could also be explained by differences in patient population. In our study, military personnel on active duty were excluded from the pool of potential claimants.

Failure to diagnose malignancies was the most common type of misdiagnosis in our study, whereas failure to diagnose a fracture or dislocation was the most common misdiagnosis in the Berlin (1) and St. Paul (2) reports. Differences in the patient populations or in the number of cases that were resolved before litigation

may explain these variations. However, the reason is not obvious.

The most common claim was for misdiagnosis of a malignancy, two-thirds of which were accompanied by a significant decrease in survival<sup>4</sup>, for which the compensation was relatively high. Most of the cases involved failure to diagnose lung carcinomas on chest radiographs and colon carcinomas on barium enema studies.

Although only one-third as frequent as claims for failure to diagnose malignancy, meritorious claims for complications related to angiography resulted in high compensation.

The malpractice cases in this study encompass situations arising from the time the patient entered the radiology department to the time the patient left the department, and include the communication of the results to clinicians. For example, one case involved a mother who was upset at the way she was treated at the registration desk in the department of diagnostic radiology, cancelled her child's head computed tomography examination, and left in anger. She finally returned many days later only to find out that her child had a fatal condition that may have been treated more successfully if diagnosed earlier. The case was settled for \$66,000. This observation emphasizes the importance of the members of the radiology department working together as a team, regardless of professional level.

There is a need to understand better the factors affecting the interpretation of images in radiology. Many authors have investigated the causes of misdiagnosis. The reasons for false-negative diagnoses and other factors influencing error rates in the interpretation of radiographs have been described in a number of articles (3, 5–10). For example, Kalisher (5) explains that reasons for false-negative results in xeromammography include nonvisualized carcinomas obscured by dense breasts and carcinomas that lack the criteria for malignancy. Johnson et al. (6) describe some reasons carcinomas of the colon are misdiagnosed, including misinterpretation and distraction. Other authors have studied the role of image perception in the interpretation and misinterpretation of radiographs (11–14).

<sup>4</sup> In any case in which payment was awarded for failure to diagnose a malignancy, a significant decrease in survival must usually be demonstrated to justify payment of the claim (i.e., otherwise damages would be minimal).

**Table 1**  
Results of 70 Radiology Malpractice Lawsuits, According to Type of Claim

Type of Claim	No. of Cases Filed	No. Paid*	No. Withdrawn	No. Pending	Compensation (dollars)	
					Range	Median
Misdiagnosis	47 (67)	31	7	9	1,000-369,000	50,000
Malignancy	21 (30)	13	5	3	25,000-369,000	162,000
Fractures, dislocations	9 (13)	6	0	3	1,000-300,000	6,500
Infiltrates in lungs, congestive heart failure	6 (9)	5	0	1	5,000-250,000	40,000
Other (vascular disease, obstetric and gynecologic problems)	11 (16)	7	2	2	9,500-200,000	50,000
Complication	10 (14)	5	2	3	27,500-1,000,000	217,000
Angiography	7 (10)	4	1	2	27,500-1,000,000	225,000
Other (contrast material reactions, myelography)	3 (4)	1	1	1	217,000	217,000
Miscellaneous	13 (19)	8	3	2	0-1,000,000	70,500
Failure to inform	6 (9)	5	1	0	0-600,000	75,000
Other (inadequate study, slip and fall, failure to test for pregnancy)	7 (10)	3	2	2	5,000-1,000,000	66,000
<b>Total</b>	<b>70 (100)</b>	<b>44 (63)</b>	<b>12 (17)</b>	<b>14 (20)</b>	<b>0-1,000,000</b>	<b>57,500</b>

Note.—Percentages in parentheses.  
\* Number of settlements and court judgments.

**Table 2**  
Injuries Sustained by Patients Filing Malpractice Claims

Injury	No. of Cases Filed	No. Paid*	No. Withdrawn	No. Pending	Compensation (dollars)	
					Range	Median
Death	14	11	0	3	5,000-300,000	66,000
Significant delay in diagnosis and high probability of decreased survival	17	11	3	3	0-312,000	75,000
Permanent, disabling injury	17	9	3	5	7,000-1,000,000	317,000
Other (temporary injury, minimal disability, pain)	13	8	3	2	1,000-28,000	7,800
No significant change in life expectancy, despite misdiagnosis	7	3	3	1	25,000-250,000	25,000
Fetal death	1	1	0	0	50,000	50,000
Injury to fetus and subsequently to newborn infant	1	1	0	0	1,000,000	1,000,000
Unwanted pregnancy	1†	...	...	...	...	...
<b>Total</b>	<b>70 (100)</b>	<b>44 (63)</b>	<b>12 (17)</b>	<b>14 (20)</b>	<b>0-1,000,000</b>	<b>57,500</b>

Note.—Percentages in parentheses.  
\* Number of settlements and court judgments.

† The unwanted pregnancy occurred in a patient who also sustained a permanent injury; compensation for the unwanted pregnancy is included in permanent injury category.

**Table 3**  
Comparison of Patient Injury with Type of Claim

Claim	Patient Death	Decreased Survival	Permanent or Disabling Injury	Temporary Injury, Minimal Disability, Pain	No Change in Prognosis*	Fetal Death	Injury to Newborn Infant	Unwanted Pregnancy
Misdiagnosis								
Malignancy	0	13	2	0	6	0	0	0
Fracture, dislocation	2	0	2	5	0	0	0	0
Lung opacities, congestive heart failure	5	0	0	1	0	0	0	0
Other	3	0	3	4	0	1	0	1†
Complications								
Angiography	1	0	5	1	0	0	0	0
Contrast material reaction, myelography	1	0	2	0	0	0	0	0
Miscellaneous								
Failure to inform	1	3	1	0	1	0	0	0
Other	1	1	2	2	0	0	1	

\* No significant change in life expectancy, despite misdiagnosis.  
† The unwanted pregnancy occurred in a patient who also sustained a permanent injury.

Some authors have suggested ways to reduce malpractice claims or to reduce damages when unintended injuries occur. Davidson (15) states that "idiosyncratic reactions [related to

contrast material reactions] require that the radiologist be expert in basic cardiopulmonary resuscitation." One paper suggests that radiologists learn from their mistakes in the format of

quality assurance conferences (16). Finally, other authors give more general advice to physicians and radiologists in terms of medical malpractice (4, pp. 43-45; 17-19), doctor-patient

relationships (20, 21), and administrative skills in quality control and risk management (22, 23).

Possible future projects include studying the parameters discussed in this paper with a larger sample size. In addition, it would be valuable to have the radiographs in each case read by an independent, objective panel and to classify the reasons for misdiagnoses, complications, and other causes of claims. From an administrative point of view, it would be important to study risk management and quality control in diagnostic radiology malpractice cases. Finally, a study could be carried out over a number of years to note trends in malpractice cases in diagnostic radiology. ■

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