

## Diagnosis Errors in French Emergency Department: Lessons from the Insurer

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### Abstract

**Background:** Diagnostic errors in the emergency department (ED) is a major patient safety concern. Analysis of the causes of diagnosis errors leading to claims to the insurer may aid the improvement of management of practices.

**Objectives:** To describe diagnostic errors declared by healthcare institutions to an medical insurer, focusing at emergency department complaints.

**Methods:** Review of closed claims in 2014 from a medical liability insurer in which patients had alleged a diagnostic error. Trained physicians reviewed the litigation files and associated medical records to determine root causes of diagnostics errors using prefilled forms from the Australian Patient Safety Foundation and the PRISMA medical method.

**Results:** A total of 107 claims were recorded and mostly corresponded to emergent conditions (85%). Trauma was the main source for diagnostic error. Chiefs of complaint were severe consequences in 52 and death in 14. According to Australian Patient Safety Foundation, leading root causes involved basic medical reasoning in 42, omission of paraclinic examinations in 5 or misinterpretation of results in 32. Circumstances participating to the occurrence of errors were organizational in 36, infrequent condition in 8, overcrowding in 5, and included patients in 32. Using the PRISMA medical method, a single root cause was identified in 24, two causes in 60, three in 20; a preferential distribution of root causes was observed toward organization (81 cases), rules based (57 cases) and skill-based failures (57 cases).

**Conclusion:** The analysis of claims collected by insurers is a complementary approach to improve diagnosis process especially in the setting of emergency department and emergent patients.

**Keywords:** emergency medicine; medical error; legal issue; insurance; diagnostic error; closed claims.

### INTRODUCTION

The number of patients referred to the emergency department has significantly increased for the last decades. In 2011, it resulted in 18 million visits in French emergency department, corresponding to an increase of 30% as compared to 2002 [1]. Emergency department are definitely devoted

to care for an unequalled panel of disorders, from elderly to obstetrics, pediatrics and neonates, from medicine to traumatology, from forensics to casualty. Therefore a wide varieties of skills are required from each practitioner. Clearly, emergency department suffer discontinuous constraints that may impair delivery of the best level of healthcare. These alter organization and staff confidence and sometimes

lead to medical errors [2]. Medical errors are defined as errors made in the process of care that result in or have the potential to result in harm to patients [3]. Medical errors have been observed in various fields of emergency medicine. Emergency medicine is by essence a diagnostic specialty [4]. It is therefore expected that errors in medical diagnosis have been reported, affecting both mild and severe disorders. Whereas diagnosis errors are assumed to represent up to 10%, they often have limited consequences. However claims can occur when diagnosis errors are perceived by patients or are responsible for damage. Claims are treated by insurance providers that collect, depict and contribute to reimbursement of victims in case of errors. Yet insurers' database appear as a pertinent and precise source of information for risk management.

Here we propose a description of diagnostic errors declared by healthcare institutions to an hospital insurer, focusing at emergency department complains.

### METHODS

**Setting:** We performed an observational and retrospective study of the closed medical malpractice claims that lead to declaration to the insurer, closed on 2014, suspected for a diagnosis error and that were either settled amicably or in court.

All the records were compiled in the SHAM database (database: declaration of claims). This database includes all claims reported to SHAM on French soil and the information is collected by the disaster managers and the lawyers of SHAM.

SHAM is a major insurer for health care institution in France. SHAM characteristics have previously been described. For details please refer to [5].

**Inclusion Criteria:** We collected claims declared to SHAM for an allegation of diagnosis error, closing between the 1st of January 2014 and 31st of December 2014, occurring in an hospital setting and resulting in an indemnity payment (either as a settlement or as a plaintiff's verdict). The major or central allegation associated with the claims established the initial basis as diagnostic error.

### DATA COLLECTION

Diagnostic error Australian was defined using the Patient Safety Foundation. Diagnosis error corresponded to an unintentionally delayed diagnosis

(information to make diagnosis was available earlier in the), a wrong diagnosis (first diagnosis was incorrect), or a missed diagnosis (no diagnosis was made). Cases were classified based upon data available from the medical chart.

Investigators examined the claims from both a medical and legal standpoint to identify potential causes and contributing factors. Review materials included medical records, expert review/opinion and case summaries.

Medical charts were anonymised before analysis (hospital, physician identity, patient identity). A descriptive analysis was given for demographic data, characteristics of diagnostic errors and consequences (permanent damage, death), organizational data. Diagnostic errors were characterized as missed or delayed diagnosis related or not to fracture and incorrect assessments of a condition. Each individual case of this data collection was reviewed by three independent investigators (YEC, AH, AT) for root causes using the PRISMA medical method [6]. In case of divergent analysis, cases were classified using a consensual discussion.

**Statistical Methods:** A descriptive analysis was performed using Microsoft® Excel® Version 14.3.2. Data is expressed as numbers (%) or percentage (%). This study was exempted from review by an ethic committee as it was retrospective and data were anonymous.

### RESULTS

#### Characteristics of Hospitals and Patients Suffering from Diagnosis Errors

For the year 2014, 107 charts from the SHAM database corresponded to complaints for diagnostic errors (Table 1); 51 have been subject to amicable management and 56 have been convicted by a court.

Mean delay before chart closing was 5 years (the majority of events occurred in year 2009); for charts settled in court and amicable agreement, the event occurred medially in 2007 and 2001, respectively. Most charts were provided by public institutions; teaching hospital represented 29%. Patients were mostly adults between 18 and 65 years of age, ratio was roughly 1 for gender. Forty one patients suffered from significant underlying disorders.

### Diagnosis Errors Reported to SHAM

Main chief of complaints related to medical errors consisted in trauma condition (Table 2). We observed that 90% of diagnosis errors were distributed among five diagnosis categories (fracture and sprains; emergent abdominal surgery; tumors; acute myocardial infarction; stroke). Diagnosis errors mostly occurred for emergent disorders (85%) and in the setting of emergency department (75%).

### Reasons for Diagnosis Errors

We recorded 202 causes of errors among the 107 cases collected for the study period. Several cases contained more than one reason, ranging from 1 to 3 (median 2). Reasons for diagnosis errors were identified and subsequently classified into eight categories according to the Australian Patient Safety Foundation (Table 3). Reported diagnosis errors mostly referred to diagnostic procedures. Omission of means (biological test, imaging and other procedures), misinterpretation of results from tests and lack of specialist advice were observed in 57, 32 and 15 cases, respectively. Forty-two shortages in basic clinical diagnostic process were also reported. By essence, physicians or medical teams were responsible for diagnosis errors in each case because of errors of judgement and inadequate decision making process; the nursing staff contributed in diagnosis error only once. Context and organization often interfered (13 and 36, respectively), mainly because communication of results or expertise/supervision were lacking (Table 4). Finally, patients' conditions and behavior sometimes participated to diagnosis errors.

Classifying mechanisms of errors according to PRISMA-medical method (Table 5) highlighted a single root causes in 24 cases, two causes in 60, three in 20; only one case associated 4 root causes. We observed a preferential distribution of root causes toward organizational (81 cases), rules based (57 cases) and skill-based failures (57 cases). To note patients-related factors were associated in 4 and no technical failure was observed. The prominent cause detected by PRISMA-medical method was shortcomings in or the lack of roentgen photo discussions, classified as organizational failure.

### DISCUSSION

In this study based on reports from an insurer database, diagnosis errors i) were more frequent for emergent conditions and in the emergency

department; ii) occurred in trauma patients in half patients; iii) were multifactorial and mostly related to lack or misinterpretation of tests, lack of specialist advice, inadequate medical reasoning and lack of supervision; iv) mostly relied upon human failures according to intuitive analysis and Prisma-medical classification.

We observed that most claims involved trauma patients. This has been extensively reported by others [7]. Up to 65% of visits to the emergency departments are related to trauma [8]. Therefore, it is forecasted that consequences of trauma are leading causes of misdiagnosis. Half claims are related to underdiagnosis of fracture and inadequate treatment of the lesion. It has been reported that mechanisms leading to errors include failure to obtain useful history taking, to perform adequate physical examination and to order or correctly interpret technical investigation. In addition, most root causes involved imaging realization and interpretation.

It has been extensively described that huge constraints weight on emergency department [9]. Emergency departments depend on external and internal organisational systems and often experience workload and time constraints, teamwork crisis and human-related factors, complex cases. This peculiar environment may lead overpressure on healthcare giver and impair decision making process. Therefore medical errors including misdiagnosis may occur. Their impact is usually mild but serious adverse outcome can emerge [10]. To improve, a systematic analysis of errors is mandatory [11] and corrective strategies exist [12,13]. Analysis of claims offer the opportunity of an external analysis of diagnosis errors. The use of systematic tools like PRISMA-medical system may help. However we perceived that context was not systematically reported; resource availability (beds, imaging, other specialists) sparsely appear in reports whereas it weights on practices, decision and quality of care. By nature, variations exist in patients' flow responsible for overcrowding that may induce to difficulties in delivering the best level of healthcare and sometimes lead to medical errors. It is unsure that systematic tools are tailored to collect this information. We suggest that precise analysis of context is cornerstone in formal evaluation of mechanism of diagnosis error.

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As others, we underlined that human failure was a key issue in diagnostic errors. Diagnosis is a multistep process that mobilizes physicians' abilities in various ways depending on patients' conditions and available resources. Whereas laboratory tests and imaging may help, diagnosis mainly relies on medical history, clinical examination, disorders' evolution. Time is missing in the emergency department; 7 minutes is the estimated time of contact between an emergency physician and a patient is to make adequate diagnosis that lead to treatment and site-of-care. Whereas trauma patients are numerically important, life-threatening impact is mostly related to other conditions [14,15]. We also observed that claims related to children were often serious disorders that sometimes lead to death [15].

**Limitations:** We acknowledge that our study suffers from limitation. Using insurance reports obviously induce bias for severity and exhaustivity. Only qualitative analysis can be withdrawn from such database. In addition modalities of data collection may be heterogeneous and analysis of circumstances may depend on the experts' specialty, skills and previous experience. This also interrogates on the qualification of non-emergency physicians to analyse problems occurring in emergency department. Therefore rationalization using systematic forms to explore every dimension and context may help for further analyses. Finally compensation is not reported whereas it may provide indirect information on the impact of diagnosis errors.

### CONCLUSION

The analysis of claims collected by insurers is a complementary approach to improve diagnosis process especially in the setting of emergency department and emergent patients. To be extensively reliable, we believe that insurers should systematically collect information about both medical case and medical environment.

### Authors' Contributions

FF, YEC and AT conceived the design of the study. AH and MA participated to the data analysis and critical reading of the results. YEC and AT wrote the manuscript. All authors read and approved the final manuscript.

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### Article summary

#### 1. Why is this topic important?

Emergency department are dedicated and organized to provide precise and accurate diagnosis to any patient

that comes through the door. However constraints that weight on emergency department impair quality of care. Therefore diagnosis error may occur and lead to severe consequences. Understanding mechanisms of these errors is cornerstone to upgrade organizations.

#### 2. What does this study attempt to show?

Medical errors leading to complaint have often severe clinical impact. We used expert analysis of medical errors declared to the insurer describe root causes leading to medical errors.

#### 3. What are the key findings?

Organizational constraints and failure in clinical reasoning were frequently observed. Characteristics of cases and patients also led to diagnosis errors.

#### 4. How is patient care impacted?

Using expert advise about root causes of diagnosis errors may help fixing organization in the setting of healthcare.

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