



Enhancing Diagnostic Accuracy in Radiology: The Role of Efficient Radiology Staff at Eskag Sanjeevani Hospital, Kolkata, India

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Abstract

Diagnostic imaging is a cornerstone of modern medical diagnosis and treatment, yet missed diagnoses remain a significant issue within radiology, often resulting in delayed treatment and adverse patient outcomes. This article examines the pivotal role of radiology technicians in mitigating missed diagnoses and enhancing diagnostic accuracy. Through a detailed analysis of practices at Eskag Sanjeevani Hospital in Kolkata, India, the article highlights how the radiology team's comprehensive approach to imaging encompassing rigorous adherence to protocols, pattern recognition, and thorough communication contributes to superior diagnostic precision. The discussion includes case studies illustrating the team's proactive identification of incidental findings, such as abnormalities in paranasal sinuses during a brain CT and posterior abnormalities detected during an abdominal CT, which led to additional diagnostic procedures and timely intervention. These practices demonstrate the significant impact of efficient radiology staff on reducing diagnostic errors, improving patient outcomes, and optimizing healthcare delivery.

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I. Background

Diagnostic imaging is a vital and indispensable tool in medical diagnosis and treatment. However, missed diagnoses are a prevalent and particularly concerning issue within the field of radiology, often leading to serious consequences for patient care. [1] Quality assurance plays a pivotal role in the healthcare system, focusing on the structure, processes, and outcomes of clinical work as key elements of quality management and assessment. Inadequate medical care, including missed diagnoses, can result in serious errors, contributing to delays in treatment, progression of disease, or even preventable deaths. [2] Missed diagnoses are especially critical as they involve failing to identify a patient's condition in a timely manner, leaving the underlying health problem unaddressed. These errors account for a significant proportion of diagnostic inaccuracies, with diagnostic errors including misdiagnoses, missed diagnoses, and delayed diagnoses occurring in 10-26% of cases. [3] According to the Institute of Medicine's Committee on Diagnostic Error in Health Care, a diagnostic error is the failure to either (a) establish an accurate and timely explanation of the patient's health issue or (b) effectively communicate that explanation to the patient, with missed diagnoses being a key contributor to these failures. [4]

Why to address missed diagnosis

Diagnostic imaging involves the professional interpretation of medical images, a process characterized by uncertainty and complexity across multiple stages. [5] The diagnostic process typically comprises six key steps: evaluating the pretest probability of a disease, confirming the patient's identity, identifying and differentiating positive and negative findings, recognizing patterns associated with positive radiologic signs, conducting differential diagnoses and categorizing findings, and ensuring timely communication of results in an actionable, reliable format. [6] Errors may occur at any stage due to various factors. Moreover, the complexity and variability of imaging techniques, combined with the intrinsic limitations of certain imaging modalities, can further complicate accurate diagnosis. [7] Studies emphasize the critical need to reduce the error rate to minimize harm to patients. Early and accurate detection not only facilitates prompt treatment but also reduces unnecessary healthcare expenditures, eliminates avoidable follow-up visits, and ensures optimal patient outcomes. [8]

Role of Radiology Technician in efficiently alleviating missed diagnosis

Efficient radiology technician play a crucial role in minimizing missed diagnoses, which are a significant concern in medical imaging. Their expertise and diligence directly impact the accuracy and effectiveness of the diagnostic process. At Eskag Sanjeevani Hospital in Kolkata, India, the radiology team is dedicated to upholding high standards of diagnostic accuracy through several key practices. Firstly, the technician at Eskag Sanjeevani Hospital rigorously adhere to protocols for evaluating the pretest probability of diseases, ensuring that each case is assessed with a comprehensive understanding of the patient's clinical context. Confirming patient identity and accurately interpreting images are central to their practice, which helps in differentiating between negative and positive findings effectively. [9] Pattern recognition is another critical area where skilled radiologists excel. By identifying and analyzing positive findings with precision, they can promptly detect abnormalities that might otherwise be missed. [10] The team's ability to conduct thorough differential diagnoses and categorize findings accurately further enhances diagnostic reliability. Moreover, the timely communication of results is a hallmark of Eskag Sanjeevani Hospital's radiology department. Results are conveyed in a clear, actionable format, ensuring that the referring physicians and patients receive crucial information without delay. This approach not only facilitates timely treatment but also helps in avoiding unnecessary additional visits and reduces healthcare costs.

Efficiency of Radiology Team in Eskag Sanjeevani Hospital, Kolkata, India

At Eskag Sanjeevani Hospital, the radiology team exemplifies a high standard of diagnostic accuracy and thoroughness. The hospital has 300 Radiology staffs (Radiologist and paramedical) in PAN India. The team's efficiency is particularly evident in their approach to conducting brain CT scans. While the primary indication for the CT scan may be a headache, the radiologists at Eskag Sanjeevani Hospital demonstrate exceptional diligence by also examining the paranasal sinuses. This meticulous practice involves assessing the paranasal surfaces in addition to the primary area of concern. When abnormalities are detected in the paranasal sinuses during a brain CT scan, the radiology technician promptly report these findings, even if they fall outside the primary diagnostic focus. The process includes obtaining informed consent from the patient before reporting these incidental findings. This approach underscores the team's commitment to comprehensive evaluation and diagnostic precision. By not restricting their analysis to the primary indication alone, the radiologists effectively mitigate the risk of overlooking significant abnormalities in adjacent or related regions. This enhanced scrutiny aids in the early detection of conditions that may otherwise be missed, thus facilitating timely and appropriate medical intervention. The benefits of this thorough methodology are substantial. Early identification of abnormalities in allied regions can lead to earlier diagnosis, which is crucial for effective treatment. Furthermore, this proactive approach contributes to cost reduction by potentially preventing the need for additional diagnostic procedures and minimizing unnecessary delays. The overall result is an improved patient experience, characterized by more accurate diagnoses, reduced healthcare expenditures, and a higher likelihood of successful treatment outcomes. In summary, the radiology team at Eskag Sanjeevani Hospital exemplifies best practices in diagnostic imaging by integrating a detailed and patient-centric approach. Their commitment to examining both the primary and associated regions enhances diagnostic accuracy and efficiency, ultimately leading to better patient care and optimized healthcare delivery. Some reports of such superior diagnostic approaches are provided below.

REQUISITION FOR C.T. SCAN
 C.T. SCAN Department
 Dhalal District Hospital

Name of patient: Surojit Paul Choudhury Age: 46 Sex: MALE/FEMALE
 Name of the Dept. placing requisition: _____
 OPD/Ward: _____ Regd. No: 29764

BODY PART/PARTICULAR ORGAN OF INTEREST FOR IMAGING

<input type="checkbox"/> CT BRAIN	<input type="checkbox"/> CT SHOULDER JOINT	<input type="checkbox"/> CT UPPER ABDOMEN
<input type="checkbox"/> CT PNS	<input type="checkbox"/> CT SCAN SCAPULA	<input type="checkbox"/> CT LOWER ABDOMEN
<input type="checkbox"/> CT OBITS	<input type="checkbox"/> CT CLAVICLE	<input type="checkbox"/> CT WHOLE ABDOMEN
<input type="checkbox"/> FACE	<input type="checkbox"/> CT SCAN/STERNING CLAVICULAR JOINT	<input type="checkbox"/> CT ENTEROGRAPHY
<input type="checkbox"/> CT TEMPORAL BONE	<input type="checkbox"/> CT SCAN HUMERUS	<input type="checkbox"/> CT KUB
<input type="checkbox"/> CT SCAN OF CV JUNCTION	<input type="checkbox"/> CT ELBOW JOINT	<input type="checkbox"/> CT CURVED PLANNER RECON OF URETER
<input type="checkbox"/> CT STYLOID PROCESS	<input type="checkbox"/> CT FOREARM	<input type="checkbox"/> CT 3D VIEW OF UROGRAM
<input type="checkbox"/> CT MAXILLA	<input type="checkbox"/> CT WRIST	<input type="checkbox"/> CT UROGRAM/IVU
<input type="checkbox"/> CT MANDIBLE	<input type="checkbox"/> CT HAND	<input type="checkbox"/> CT PELVIS
<input type="checkbox"/> CT TM JOINT	<input type="checkbox"/> CT FINGERS	<input type="checkbox"/> 3D VIEW
<input type="checkbox"/> CT TONGUE	<input type="checkbox"/> CT HIP JOINTS	
<input type="checkbox"/> CT DENTAL SCAN	<input type="checkbox"/> CT FEMUR	
<input type="checkbox"/> CT 3D VIEW OF DENTAL	<input type="checkbox"/> CT KNEE JOINT	
<input type="checkbox"/> CT NECK	<input type="checkbox"/> CT TIBIA/FIBULA(LEG)	
<input type="checkbox"/> CT CHEST	<input type="checkbox"/> ANKLE	
<input type="checkbox"/> CT HRCT CHEST	<input type="checkbox"/> FOOT	
<input type="checkbox"/> CT STERNUM	<input type="checkbox"/> 3D VIEW	
<input type="checkbox"/> 3D VIEW		

Patients condition:
 Conscious
 Semi conscious
 Unconscious
 Non-co-operative

Any history of:
 Allergy
 Bronchial Asthma
 Cardiac Pathology

WHETHER CONTRAST REQUIRE: YES NO
 YES NO

CLINICAL HISTORY: Headache

PROVISIONAL DIAGNOSIS: _____

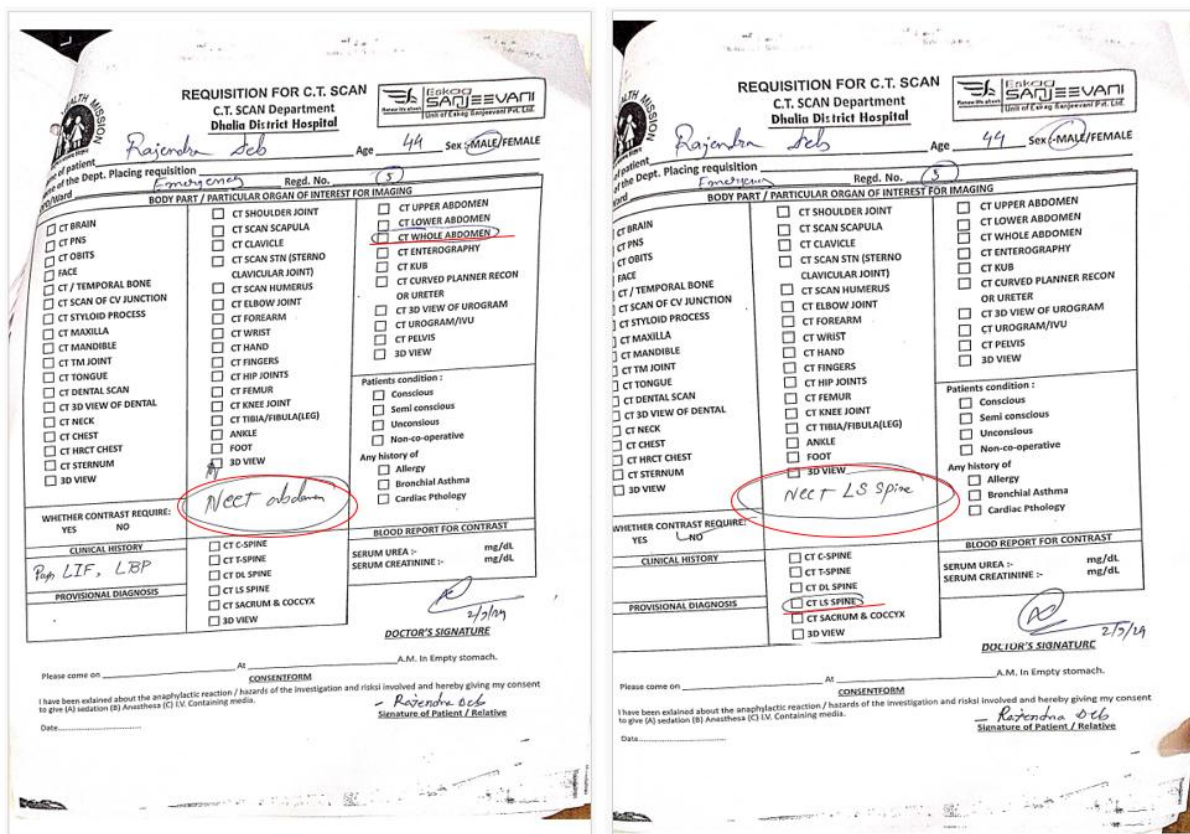
BLOOD REPORT FOR CONTRAST
 SERUM UREA: _____ mg/dl
 SERUM CREATININE: _____ mg/dl

DOCTOR'S SIGNATURE: Dr. D. D. D.

CONSENT FORM
 I have been explained about the anaphylactic reaction / hazards of the investigation and risks involved and hereby giving my consent to give (A) sedation (B) Anesthesia (C) I.V. containing media.
 Signature of Patient / Relative: Mampi Paul

Example 1: Paranasal Sinus Screening in Brain CT

Figure 1 illustrates the case study in which the inclusion of paranasal sinuses in a CT scan was done, despite the primary indication being a headache and the physician's specific request for a brain CT. During the procedure at Eskag Sanjeevani Hospital, Kolkata, India, the technician identified abnormalities in the paranasal region while performing the brain CT. Consequently, the technician recommended and obtained the patient's consent to perform an additional paranasal CT scan on the spot. This immediate follow-up allowed for the comprehensive assessment of the paranasal sinuses, ensuring that incidental findings were appropriately investigated and documented. The radiology team included the paranasal sinuses in a routine brain CT scan and identified significant abnormalities, resulting in an unexpected but necessary treatment path. This practice of including adjacent regions in imaging ensured no pathology went undetected, significantly improving patient outcomes.



Example 2: Lumbar Spine Abnormalities in Abdominal CT

A patient presenting with abdominal pain underwent a CT scan focusing on the abdomen. During the scan, the radiology team identified an abnormality in the posterior lumbar spine, an area not covered in the initial request. Prompt identification and follow-up with a CT of the lumbar spine revealed a spinal disorder that was treated earlier than would have been possible under standard protocols. Figure 2 depicts this case study of addition of a CT of the lumbar spine (CT LS Spine) in the diagnostic workup, despite the initial indication being abdominal pain and the physician's original prescription specifying only a CT of the abdomen. During the CT abdomen, the technician identified abnormalities in the posterior region of the patient that could not be fully evaluated with the CT of the abdomen alone. The technician promptly reported these findings to the patient. Following this report, the patient consented to and underwent a CT LS Spine, which ultimately facilitated the detection of the underlying disorder.

II. Conclusion

The role of radiology technicians is crucial in addressing the challenges of missed diagnoses in medical imaging. At Eskag Sanjeevani Hospital, the dedication and expertise of the radiology team exemplify best practices in diagnostic imaging. By extending their focus beyond the primary diagnostic indications and incorporating comprehensive evaluations of associated regions, the team effectively minimizes the risk of overlooked abnormalities. This thorough approach not only facilitates early detection and accurate diagnosis but also enhances patient care by reducing unnecessary healthcare costs and preventing delays in treatment. The evidence presented underscores the value of efficient radiology staff in improving diagnostic outcomes and underscores the need for continued emphasis on quality assurance and comprehensive imaging practices in the field of radiology.

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Technical Contributor: Mr. Tapas Biswas

List of Radiologist Doctors in Eskag Sanjeevani PAN India:

SL NO.	DOCTOR NAME (RADIOLOGIST)
1	DR. ABHISHEK BISWAS
2	DR. SHANKHADIP MULA
3	DR. MADHURI SAHU
4	DR. ARUP MAITY
5	DR. DEBARPITA DUTTA MAITY
6	DR. DIJENDRA NATH BISWAS
7	DR. SHALINI PANDEY
8	DR. INDRANI HAZRA
9	DR. SARADINDU MONDAL
10	DR. SABNAM PARVIN
11	DR. P GOSWAMI
12	DR. AMRITA GANGULY
13	DR. ASHIM BISWAS
14	DR. SHIBAYAN NATH ROY
15	DR. SHUBHAM SAHA
16	DR. ARGHA DUTTA
17	DR. SABYASACHI SARKAR
18	DR. ANUP BHARGAVA
19	DR. RAMUDAR SINGH
20	DR. CHANDAN ROY NASKAR

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