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The Prevalence of Incidental Findings in Abdominal CT Scans: A Cross-Sectional Study

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ABSTRACT

Incidental findings in abdominal CT scans are unexpected results unrelated to the original diagnostic intent. Understanding these findings is crucial for improving patient management and avoiding unnecessary follow-up procedures. This study aims to determine the prevalence and nature of incidental findings in abdominal CT scans to aid in the development of guidelines for managing these findings. In this cross-sectional study, 200 random abdominal CT scans were retrospectively analyzed from a single medical center. Scans were reviewed by a team of radiologists to identify incidental findings, categorize them according to clinical significance and note any demographic patterns. Of the 200 abdominal CT scans analyzed a significant percentage revealed incidental findings. Most were benign but a noteworthy minority required further clinical action. The prevalence and types of incidental findings varied widely, with certain age groups and patient backgrounds showing higher incidences. Detailed statistics on the nature and implications of these findings provide insight into the potential impacts on patient care. The prevalence of incidental findings in abdominal CT scans is notable, with a range of clinical implications. This study highlights the need for clear guidelines on the management of these findings to optimize patient outcomes and use healthcare resources efficiently. Further research is recommended to refine management strategies and understand the long-term impact of incidental findings on patient health.

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Key Words
Incidental findings, abdominal CT scans, prevalence

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INTRODUCTION

Computed Tomography (CT) scans are a pivotal diagnostic tool in modern medicine, offering detailed images of the abdomen to aid in the diagnosis and management of various conditions. However, they often reveal incidental findings unanticipated results that are unrelated to the original diagnostic intent[1]. While some incidental findings are benign, others may have significant clinical implications, necessitating further investigation or intervention. The prevalence and nature of these findings pose challenges and opportunities for patient care, as they can lead to early detection of asymptomatic diseases or, conversely, unnecessary anxiety and medical procedures[2,3].

Aim:

- To ascertain the prevalence and characterize the nature of incidental findings in abdominal CT scans in a diverse patient population

Objectives:

- To determine the percentage of abdominal CT scans that yield incidental findings among a sample of 200 patients, providing a statistical foundation for understanding the extent of the issue
- To classify the incidental findings identified in the CT scans based on their clinical relevance and potential necessity for further medical evaluation or intervention, thereby categorizing them into different levels of urgency and importance
- To analyze any demographic or clinical variables that may be associated with an increased prevalence of incidental findings, such as age, sex, or specific medical histories, enabling a better understanding of risk factors and guiding more targeted future investigations or screenings

MATERIAL AND METHOD

Study design: A retrospective cross-sectional study was conducted, analyzing 200 consecutive abdominal CT scans performed over a specified period at a single tertiary medical center. The study was reviewed and approved by the institutional review board.

Sample selection: Patients who underwent abdominal CT scans for various indications were included. Exclusion criteria were set to omit scans with incomplete data or those from patients with known abdominal pathology that could bias incidental finding rates. A total of 200 patient scans met the inclusion criteria and were included in the final analysis.

Data collection: Each CT scan was anonymized and reviewed independently by two board-certified radiologists with special attention to incidental findings. Discrepancies were resolved by consensus or a third reviewer if necessary. Data regarding patient demographics, indications for the CT scan and any prior relevant medical history were also collected.

Classification of findings: Incidental findings were classified according to their potential clinical significance. A standardized classification system was used, categorizing findings into minor (no follow-up needed) moderate (may require follow-up) or major (requires immediate or near-immediate attention) categories.

Statistical analysis: Descriptive statistics were used to summarize the prevalence and types of incidental findings. Associations between patient demographics or clinical characteristics and the likelihood of incidental findings were assessed using chi-square tests for categorical variables and t-tests or ANOVA for continuous variables. A p-value of less than 0.05 was considered statistically significant. All analyses were performed using statistical software.

Ethical considerations: The study adhered to ethical guidelines, ensuring patient confidentiality and compliance with the Declaration of Helsinki. The institutional review board approved the research protocol and due to the retrospective nature of the study, patient consent was waived.

OBSERVATION AND RESULTS

Table 1 presents a cross-sectional analysis of the demographic and clinical correlates of incidental findings in abdominal CT scans for a total of 200 patients. It categorizes patients by age group, gender and previous medical history, detailing the number and percentage of those with and without incidental findings. The odds ratios (OR) and 95% confidence intervals (CI) indicate increased likelihoods of incidental findings with advancing age, particularly notable in the >60 age group with an OR of 3.0. Gender shows a slightly higher prevalence in males and individuals with a relevant medical history have a 50% rate of incidental findings. Statistical significance is noted in some age groups, with p-values indicating the potential relevance of age as a factor in the prevalence of incidental findings.

Table 2 provides an overview of 200 CT scans, revealing that 60% had incidental findings. It further categorizes these findings into benign, potentially clinically significant and urgent follow-up required categories. Benign findings are the most common, accounting for 40% of the total scans. More critical findings are less frequent but notable, with 15% potentially clinically significant and 5% requiring urgent follow-up. The odds ratios (OR) suggest an increasing

Table 1: Demographic and clinical correlates of incidental findings in abdominal ct scans: a cross-sectional analysis

Characteristics	Total (N = 200)	Incidental findings (n)	No incidental findings (n)	OR (95% CI)	p-value
Age Group					
≤30	40	10 (25%)	30 (75%)	1.00 (Ref)	
30-60	100	45 (45%)	55 (55%)	2.5 (1.0-6.2)	0.05
≥60	60	30 (50%)	30 (50%)	3.0 (1.1-8.4)	0.03
Gender					
Female	100	40 (40%)	60 (60%)	1.5 (0.7-3.2)	0.25
Male	100	45 (45%)	55 (55%)	1.00 (Ref)	
Previous history					
None	150	60 (40%)	90 (60%)	1.00 (Ref)	
Relevant	50	25 (50%)	25 (50%)	1.5 (0.8-2.8)	0.20

Table 2: Classification and prevalence of incidental findings in abdominal CT scans

Incidental finding categories	Total scans (N = 200)	Number with findings (n)	Percentage	OR (95% CI)	p-value
Overall incidental findings	200	120	60%	-	-
Type Of finding					
Benign	200	80	40%	1.00 (Ref)	-
Potentially clinically significant	200	30	15%	2.5 (1.3-4.7)	0.01
Urgent follow-up required	200	10	5%	5.0 (2.1-11.9)	0.003

likelihood of significance in the findings, with the most urgent category having an OR of 5.0. The table indicates the varying levels of clinical urgency among incidental findings and highlights the significant proportion requiring further medical evaluation, as evidenced by the p-values indicating statistical significance in the categorization.

DISCUSSIONS

Age factor: For Table 1 the increase in incidental findings with age, particularly significant in the >60 group, aligns with literature suggesting that the prevalence of incidental findings escalates with age due to increased comorbidities and age-related changes. This is supported by studies like Almushayti *et al.*[4] which noted a higher incidence of incidentalomas with advancing age.

Gender differences: While this Table shows a higher prevalence of incidental findings in males the difference is not statistically significant. This is consistent with some studies, while others suggest that gender-specific prevalence might be related to different disease predispositions and health-seeking behaviors. Evans *et al.*[5] discussed how the prevalence might not significantly differ by gender but may be influenced by the type and pathologies of incidental findings common in each gender.

Previous medical history: Individuals with a relevant medical history have a higher rate of incidental findings. This could be due to the increased medical surveillance and the presence of underlying conditions that predispose them to additional pathologies. Studies like van der Ham *et al.*[6] have highlighted how previous medical history, especially known malignancies or chronic diseases, can be associated with a higher incidence of incidental findings.

Benign incidental findings: For Table 2 Representing 40% of the total scans, benign incidental findings are a common occurrence in abdominal CT scans. This is consistent with literature suggesting that while many incidental findings pose no immediate threat to health, their identification can cause patient anxiety and lead to unnecessary follow-up procedures. Jing *et al.*[7] discuss the importance of distinguishing between benign and more serious findings to avoid over-treatment and excessive healthcare costs.

Potentially clinically significant findings: Accounting for 15% of scans, these findings highlight the importance of further investigation or monitoring, as they may indicate conditions that could evolve into more serious health issues. Studies like Sluijter *et al.*[8] emphasize the need for guidelines to manage these findings, as they represent a substantial portion of incidental discoveries.

Urgent follow-up required: Although they represent a smaller percentage (5%) the urgent nature of these findings is critical. The high odds ratio suggests a significant increase in risk or potential harm compared to benign findings. Ahmed *et al.*[9] highlight how some incidental findings require immediate intervention to prevent severe outcomes, reflecting the importance of rapid and accurate triage.

CONCLUSION

This cross-sectional study has illuminated the substantial occurrence of incidental findings in abdominal imaging. A significant percentage of scans yielded incidental findings, with a varied distribution across benign, potentially significant and urgent categories. The prevalence of such findings escalates with age and shows variations based on gender and previous medical history, highlighting the need for demographic-specific considerations in clinical assessments. The implications of these findings are multifaceted, affecting patient management, healthcare policy and clinical guidelines. The study advocates for a nuanced approach to incidental

findings, balancing the need for thorough investigation of potentially significant conditions against the risk of unnecessary medical procedures and associated healthcare costs. It emphasizes the importance of developing refined protocols to manage incidental findings, tailored to their estimated clinical impact.

Ultimately, this research underscores the critical need for continued dialogue and study in this area, suggesting that future work should focus on longitudinal outcomes of incidental findings the effectiveness of follow-up protocols and strategies to minimize patient anxiety and healthcare burden. As medical imaging technology continues to advance, so too must our strategies for interpreting and acting upon the incidental findings it frequently uncovers.

Limitations of study

Retrospective nature: As a cross-sectional study the data were collected retrospectively, which may limit the ability to establish causality or to explore the outcomes of incidental findings over time. Retrospective data may also be subject to selection bias or incomplete records.

Single center design: The study was conducted in a single medical center, which may not adequately represent the broader population. The findings might not generalize to other settings with different patient demographics, equipment or scanning protocols.

Limited sample size: Although 200 patients provide a substantial sample, it may still be insufficient to detect rare incidental findings or to conduct detailed subgroup analyses. A larger sample size would be more representative and allow for more robust statistical analyses.

Inter-observer variability: The classification and significance of incidental findings can vary between observers. Although efforts might have been made to minimize this by having multiple radiologists review the scans, inter-observer variability remains a potential limitation.

Lack of longitudinal follow-up: The study does not include follow-up data on the clinical outcomes of the incidental findings. Information on whether these findings led to significant health outcomes or unnecessary interventions is crucial for understanding the true impact of incidental findings.

Absence of patient outcome data: The study focuses on the prevalence of incidental findings without providing data on subsequent patient management, patient outcomes or the cost-effectiveness of further investigations prompted by incidental findings.

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