Incidental hepatic steatosis in radiology reports: a survey of emergency department clinicians' perspectives and current practice

Short title: Survey of emergency clinicians on hepatic steatosis

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Abstract

Introduction:

Hepatic steatosis is a relatively common incidental finding on computed tomography (CT) studies performed for patients in the emergency department (ED). The aim of our survey was to explore the preferences and perspectives of emergency physicians regarding reporting of incidental findings with a focus on hepatic steatosis.

Methods:

A prospective web-based questionnaire was conducted and distributed electronically to emergency clinicians with anonymous collection of responses.

Results:

A total of 236 responses were received. The true response rate could not be determined due to different methods of electronic distribution. However, there was an estimated representation of 8.3% for ED physicians and 2.5% for trainees. The median time spent on the survey was less than 3 minutes. Seventy-seven percent answered yes to giving an incidental finding more significance if mentioned in the conclusion section. More than half of respondents (60.2%) reported that they would like hepatic steatosis to be mentioned in a CT report while 30%

reported that it was irrelevant in the emergency setting and 10% reported that they did not want it mentioned in the report. The majority (83.1%) reported that they would include this finding in the discharge summary for GP follow-up and less than half (44.1%) would mention it to patients.

Conclusion:

Our survey highlights the importance of clear communication between radiologists and ED physicians when incidental findings are encountered. Radiologists play an important role in alerting ED physicians and clinicians who have access to patients' radiology reports to the presence of incidental findings including hepatic steatosis.

Keywords:

Computed Tomography

Emergency Medicine

Fatty Liver

Incidental Findings

Non-alcoholic Fatty Liver Disease

Background:

Hepatic steatosis is a relatively common incidental finding on computed tomography (CT) studies performed for patients in the emergency department (ED) with a prevalence of up to 25%.(1) The aetiology of hepatic steatosis is often unknown to the reporting radiologist in this setting. Whether hepatic steatosis relates to a secondary cause or is part of non-alcoholic fatty liver disease (NAFLD), communicating its presence to clinicians is important. NAFLD is defined by accumulation of fat in the liver proven on biopsy or imaging and exclusion of secondary causes of fat accumulation such as significant alcohol intake. NAFLD represents a spectrum of liver disease ranging from simple hepatic steatosis through to non-alcoholic steatohepatitis (NASH), and in a minority, NASH-related cirrhosis and ultimately hepatocellular carcinoma and/or liver failure.(2) Simple hepatic steatosis, which indicates presence of ≥ 5% hepatic steatosis without hepatocyte injury, follows a benign non-progressive course in the majority of patients.(3) NASH indicates presence of ≥ 5% hepatic steatosis with inflammation and

hepatocyte injury (ballooning) with or without fibrosis.(2) NASH, which cannot be distinguished from simple hepatic steatosis on routine imaging, can be complicated by advanced fibrosis, cirrhosis, liver failure and/or HCC in 15-20% of patients.(2, 4) The prevalence of NASH among patients with NAFLD is estimated to be 59.1% among patients with an indication for a liver biopsy, 29.9% among patients without an indication for a liver biopsy and between 1.5% to 6.5% in the general population.(2, 5) Furthermore, emerging evidence suggests that the stage of fibrosis, which cannot be assessed on routine imaging, is the strongest predictor of all-cause mortality.(6, 7) Finally, NAFLD, including simple hepatic steatosis, is associated with metabolic syndrome and cardiovascular outcomes beyond the known traditional risk factors (e.g. obesity, hypertension, diabetes …etc). Thus, incidental hepatic steatosis due to NAFLD is a finding of clinical importance that deserves recognition and follow-up to identify or prevent potentially significant consequences .(8-10)

Emergency department physicians are often challenged by time-constrained management of acute presentations of patients in an emergency setting. Numerous studies have evaluated the prevalence of incidental findings on CT studies performed in ED settings. However, the majority of such studies report incidental focal lesions without necessarily including hepatic steatosis.(11-13) The role of ED physicians is unfortunately overlooked in studies evaluating non-urgent conditions such as hepatic steatosis. For example, a survey performed by Wieland *et al.* provided information on practice gaps in the medical care of patients with NAFLD from the perspectives of general practitioners (GPs) and specialists without including ED physicians.(14) In Australia, a study of awareness and opinions of NAFLD assessed clinicians across six hospital specialties but did not include ED physicians(15) and a similar study focussed on GPs only.(16)

There are no specific guidelines for radiologists on reporting incidental hepatic steatosis or on providing recommendations when this finding is encountered. The most recent radiology recommendations from the White Paper of the American College of Radiology on incidental hepatic findings provided guidance on management of incidental *focal* hepatic lesions only.(17) In addition, hepatic steatosis has been shown to be underreported on CT studies for emergency patients.(1, 18) Therefore, the topic of incidental hepatic steatosis in ED settings requires further attention to improve communication between radiology and emergency clinicians which can potentially lead to improved patients' care and promote early detection of associated debilitating

conditions. The aim of our survey was to explore the preferences and perspectives of emergency clinicians regarding reporting of incidental findings with a focus on hepatic steatosis.

Materials and Methods:

An anonymous web-based cross-sectional survey was conducted to explore perspectives and preferences of emergency clinicians on incidental findings on radiology reports of emergency patients with more specific questions relevant to hepatic steatosis. The survey was designed by the authors in an interdisciplinary approach. Eleven questions including ten multiple-choice questions and one question for comments were created without any intention to test participants' knowledge of the topic but rather to address perspectives, preferences and current practice. Care was taken in wording of the questions to provide answer choices reflective of different possible scenarios and different practice attitudes. We included one question regarding level of practice (consultant, career medical officer, trainee), four questions on reporting of incidental findings in general, five questions on incidental hepatic steatosis and a final question for comments (Appendix I). The relatively small number of questions, and hence required time to complete the survey, were intended to encourage participation and decrease the number of incomplete surveys and drop out. Questions were initially tested on a pilot group of emergency clinicians at our centre with editing after feedback prior to distribution.

Institutional Review Board approval was obtained from our centre. Review and approval by the Australasian College of Emergency Medicine (ACEM) was also obtained. ACEM (https://acem.org.au/) is the not-for-profit organisation responsible for training emergency physicians and advancement of professional standards in emergency medicine in Australia and New Zealand. No incentives were offered for survey participation. The survey was conducted using SurveyMonkey (www.surveymonkey.com). A link to the survey was included in the ACEM Bulletins under the *Have Your Say* section from 27 July to 19 October 2018.(ACEM Bulletins link: https://acem.org.au/Content-Sources/About/Publications/ACEM-Bulletin) The Bulletins are routinely emailed to ACEM members on a weekly basis. In addition, sharing of the survey link through emails and social media was encouraged among emergency clinicians in different centres. Survey responses were downloaded into a password-protected Microsoft Excel

spreadsheet (Microsoft Corporation, Redmond, VA, USA). Categorical descriptive data are presented as proportions and percentages.

Results:

A total of 236 responses were received; 166 (70.3%) by consultants, 62 (26.3%) by trainees and 8 (3.4%) by career medical officers. The true response rate could not be determined due to different methods of electronic distribution using weekly ACEM Bulletins emailed to members as well as individual emails and sharing of survey on social media. The number of ACEM members is estimated to be more than 2000 fellows and 2500 trainees(19) giving estimated representations of 8.3% and 2.5% respectively. All started surveys were completed. The median time spent on the survey was 2 minutes and 50 seconds (IQR, 02:10 to 03:43).

Reporting of incidental findings:

Most respondents (77.1%) answered yes to giving an incidental finding more significance if mentioned in the conclusion section of the report as opposed to being mentioned only in the body of the report. The majority (86.4%) preferred incidental findings to be mentioned in the conclusion as well as body of report when the report did not detail findings for each organ. Almost half of the respondents (48.7%) answered that they read the body of report as well as the conclusion while 25.0% answered *most times* and 15.3% answered *sometimes* (Figure 1). Sixty percent reported that their obligation to act on an incidental finding reported in the conclusion depended on the clinical setting while 21.6% reported that they would feel obliged to act on it. About 10% reported that they would only feel obliged if further assessment / tests were recommended in the report. A minority (8.5%) reported that they would not feel obliged at all (Figure 2).

Perspectives on reporting and assessment of hepatic steatosis in ED:

More than half of the respondents (60.2%) reported that they would like hepatic steatosis to be mentioned in a CT report while 29.7% reported that it was irrelevant in the emergency setting

and 10.2% reported that they did not want it mentioned in the report. Sixty-four percent preferred hepatic steatosis to be mentioned in both body and conclusion sections of reports, 23.6% preferred it in the body of the report and 3.4% preferred it was not mentioned.

Respondents were given management options for when incidental hepatic steatosis was encountered and were allowed more than one option for answers. The majority (83.1%) reported that they would include this finding in the discharge summary for GP follow-up while less than half (44.1%) would mention it to patients. Close to 30% would ignore this finding if deemed clinically irrelevant and 10.2% would ignore it completely (Figure 3). Nearly three-quarters (74.2%) of respondents reported that they would not act differently if hepatic steatosis was mentioned in the body but not in the conclusion of the report while 18.6% reported they would.

Comments from survey respondents:

Two multiple choice questions included sections where comments could be made. In addition, a final question for general comments was included (Appendix I). Comments regarding reporting of incidental findings were relatively consistent in expecting that "any relevant or incidental findings should be summarised in a report" as this "would mean these patients are more likely to get the follow up they need". Some comments identified mentioning a finding in the body of the report only may lead to less recognition by clinicians: "I might notice it, and it would subconsciously make me think it is less important". There was one comment on the role of radiologists as technical service providers for image interpretation only; "It is the job of the Radiologist to report the CT scan and the job of the treating physician to decide what the significance means for the particular patient and act accordingly." Several comments related to reporting and assessment of hepatic steatosis in the emergency setting were made by respondents. Comments regarding the significance of hepatic steatosis ranged from dismissal as a "non-serious incidentaloma, where the over investigation will likely result in resource consumption without benefit for the patient or society" to recognition that there is a "lack of understanding re significance of fatty liver" and that "there is no direction as to the appropriate workup of newly diagnosed fatty liver found incidentally on CT or U/S". Many comments emphasized that hepatic steatosis was an incidental finding for GP follow-up rather than ED assessment.

Discussion:

The increase in utilisation of diagnostic imaging tests has led to an increase in identification of incidental findings. Incidental hepatic steatosis is increasingly encountered by radiologists on different imaging modalities but is sub optimally reported on CT studies in the ED setting. In a Canadian cohort, hepatic steatosis was demonstrated in about 25% of 450 emergency patients undergoing a CT study. Less than half of these patients had hepatic steatosis mentioned in their radiology reports.(1) In an audit of CT studies for renal colic performed at our centre, we encountered a similar prevalence of 26% of which only 28% of radiology reports documented hepatic steatosis (Figure 4).(18) Radiologists need to be aware of the high prevalence of hepatic steatosis in the general population and its potential clinical course when it progresses to NASH or when associated with significant fibrosis. It follows, the presence of normal liver function tests does not rule out simple hepatic steatosis or NASH. Among NAFLD patients in Western countries, 10 to 20% will not have general obesity, so called "lean-NAFLD", with an even higher percentage reported in Asian countries.(20) Therefore, radiological evidence of hepatic steatosis may likely be the main factor driving further clinical assessment for liver disease and cardiovascular risk factors in patients who are not obese.

Reporting newly identified hepatic steatosis in the conclusion section of radiology reports resulted in more documentation of this finding in clinical charts in a study of 127 patients in the United States.(21) Almost half of our survey respondents reported that they read the body and conclusion sections of radiology reports and a quarter would read both most of the times. However, most of our respondents placed more weight on findings mentioned in the conclusion section; an expected finding. Therefore, radiologists are encouraged to report incidental findings including hepatic steatosis when present in the conclusion section of the report.

Since the clinical course of simple hepatic steatosis is considerably different from that of NASH and from steatosis associated with significant fibrosis, a crucial step in further assessing incidental steatosis is to identify the latter groups. Neither NASH, a histologic diagnosis, nor hepatic fibrosis have radiological findings that distinguish them from simple hepatic steatosis. Identification of hepatic fibrosis without a biopsy requires a combination of biochemical markers and elastography-based imaging techniques.(22) However, visceral obesity, a component of metabolic syndrome that is found even in those with "lean-NAFLD" and associated with higher

risk for NASH, fibrosis and HCC, can be seen on CT studies. Inclusion of obesity markers in the radiology report is therefore potentially useful. In a survey addressing clinicians' and patients' attitudes to reporting of *obesity* in radiology reports, both groups reported that they would be more likely to discuss overweight/obesity findings if mentioned in radiology reports. They also reported that such information would not be considered insulting and unlikely to result in imaging avoidance.(23) However, quantitative assessment of obesity (visceral and/or subcutaneous) remains a research tool and is difficult to embed in routine radiology reporting due to time constraints. On the other hand, inclusion of hepatic steatosis in the radiology report based on qualitative or quantitative assessment of hepatic attenuation is easier and can be part of routine practice.(24) Less than half of our respondents reported that they would mention hepatic steatosis to their patients and 30% would ignore this finding if deemed clinically irrelevant. It is important for radiologists to remember that reports for imaging studies, even in the emergency setting, are still accessible at a later stage by patients themselves and by other clinicians including patients' GPs regardless of the healthcare provider who requested these studies. This has become a much easier process in Australia with the introduction of My Health Record.

More than half of the respondents regarded the obligation for further assessment of an incidental finding mentioned in the conclusion section of the report was dependent on the clinical setting. This finding is potentially encouraging to radiologists who would be less inclined to over-report incidentals findings due to fear of initiating a cascade of unnecessary investigations. While this feeling among some radiologists is probably shared with a minority of our respondents as evidenced by one of the comments above, the significance of incidental hepatic steatosis is not always clear to reporting radiologists. For example, in an elderly patient with multiple known comorbidities, such a finding may be considered irrelevant. However, the increase in imaging utilisation and the increase in prevalence of obesity and hepatic steatosis in younger patients are likely to make this finding of greater significance for such patients. Assessing which patients with hepatic steatosis would likely benefit from further work-up is currently beyond the scope of Australian EDs but has been clearly outlined by gastroenterology and hepatology guidelines.(2, 25, 26) The importance of radiology findings in emergency imaging studies therefore extends beyond answering urgent clinical questions and includes reporting of incidental findings as well as opportunistic screening for conditions with potential long-term outcomes such as hepatic steatosis.

Australian EDs continue to experience increasing complex presentations resulting in increased waiting times and hospital resources utilisation.(27) Clear communication between radiologists and ED physicians is required for urgent and non-urgent findings. Radiologists are required to provide reports for their ED patients that answer specific clinical questions and address incidental findings without ambiguity. Recommendations for follow-up and management of incidental findings on imaging are needed where relevant and are usually valued by ED physicians and GPs.(28, 29) In the case of incidental hepatic steatosis, a recommendation for further imaging is not required. However, a general recommendation for correlation with liver function tests and clinical assessment of liver and cardiovascular disease can be made if felt necessary. Most of our respondents acknowledge that the significance of incidental findings is weighed within the clinical setting and that such findings would likely be referred to GPs for follow-up. Australian GPs encounter this finding frequently and can organize and provide appropriate management and follow-up for such patients with a guide available on their college website(25) among other resources.(2, 26)

Limitations:

Our survey has some limitations. First, the number of respondents was modest despite attempts to distribute the survey through different avenues. However, our sample size is larger compared to two previous Australian surveys of non-ED clinicians.(15, 16) Second, we did not include details on respondents such as demographics, years of experience or hospital setting (urban vs rural and academic vs non-academic). This was intentional to shorten survey response time and maximise response rate admitting that these details could have influenced responses to some degree. Finally, we did not include questions on alcohol as a cause for hepatic steatosis as effects of alcohol are quite familiar to ED physicians in terms of screening, interventions, acute presentations and long-term complications.

In conclusion, our survey highlights the importance of clear communication between radiologists and ED physicians when incidental findings are encountered on imaging. Radiologists play an important role in alerting ED physicians and other clinicians who have access to patients' radiology reports, including GPs, to the presence of hepatic steatosis. Equally, ED physicians and other clinicians need to recognise the importance of hepatic steatosis as an incidental finding and initiate appropriate management steps where relevant.

Figure legends:

Figure 1. When reviewing the written report for an abdominal CT scan, do you read the body of the report as well as the conclusion?

Figure 2. Do you feel obliged to act on an incidental finding if mentioned in the conclusion of the report?

Figure 3. Responses on current practice of ED clinicians when incidental hepatic steatosis is mentioned in a CT report (respondents were allowed to choose more than one option).

Figure 4. Axial non-contrast CT slice of a non-obese patient undergoing an emergency CT for suspected renal colic. Low attenuation of the liver compared to the spleen is noted indicating hepatic steatosis.(30)

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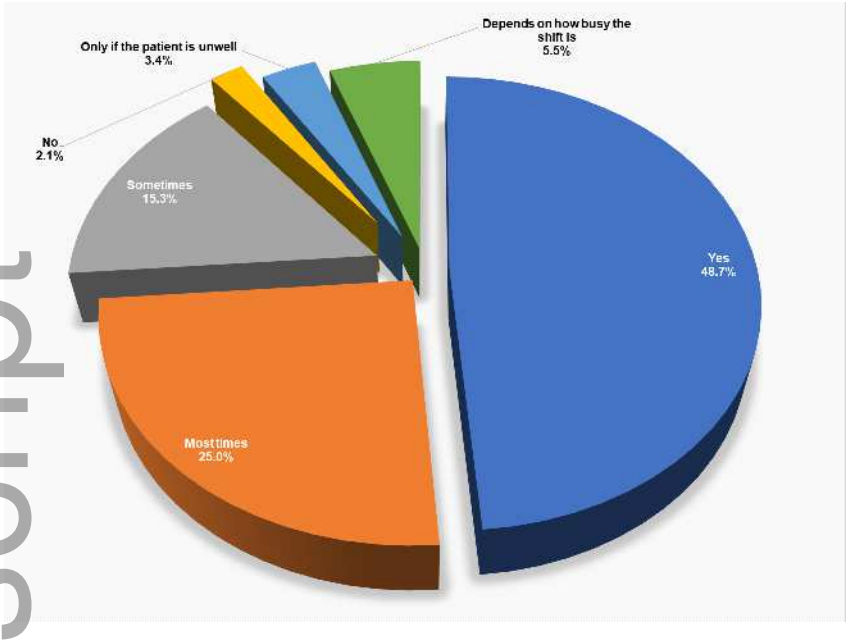

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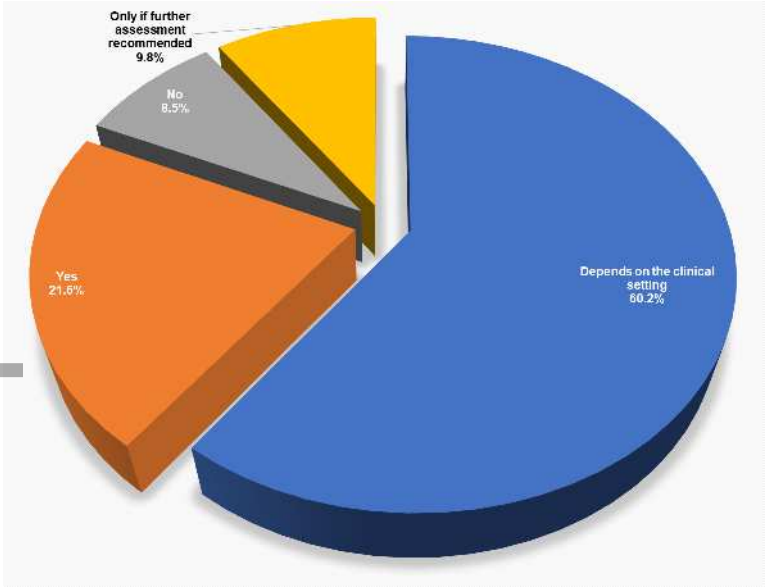

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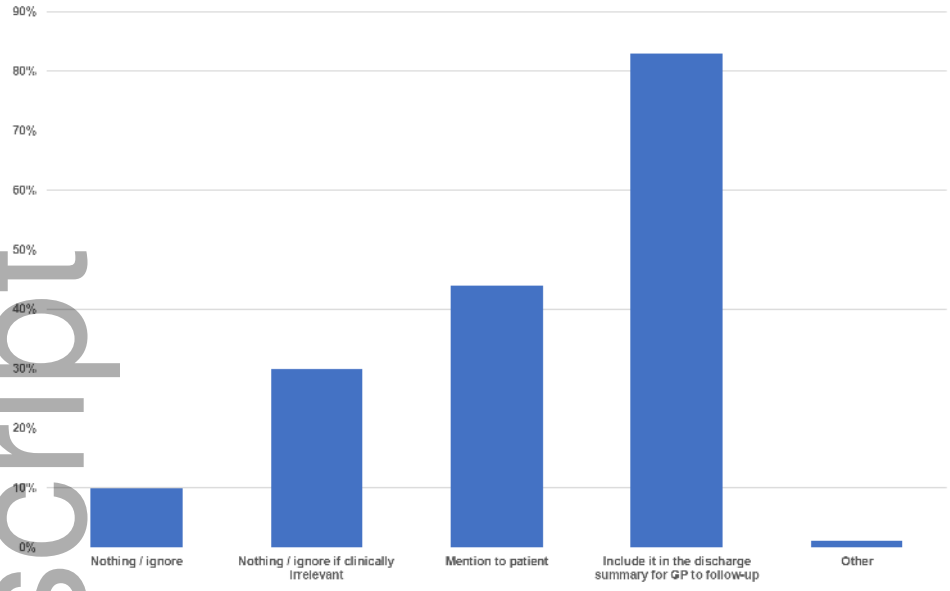

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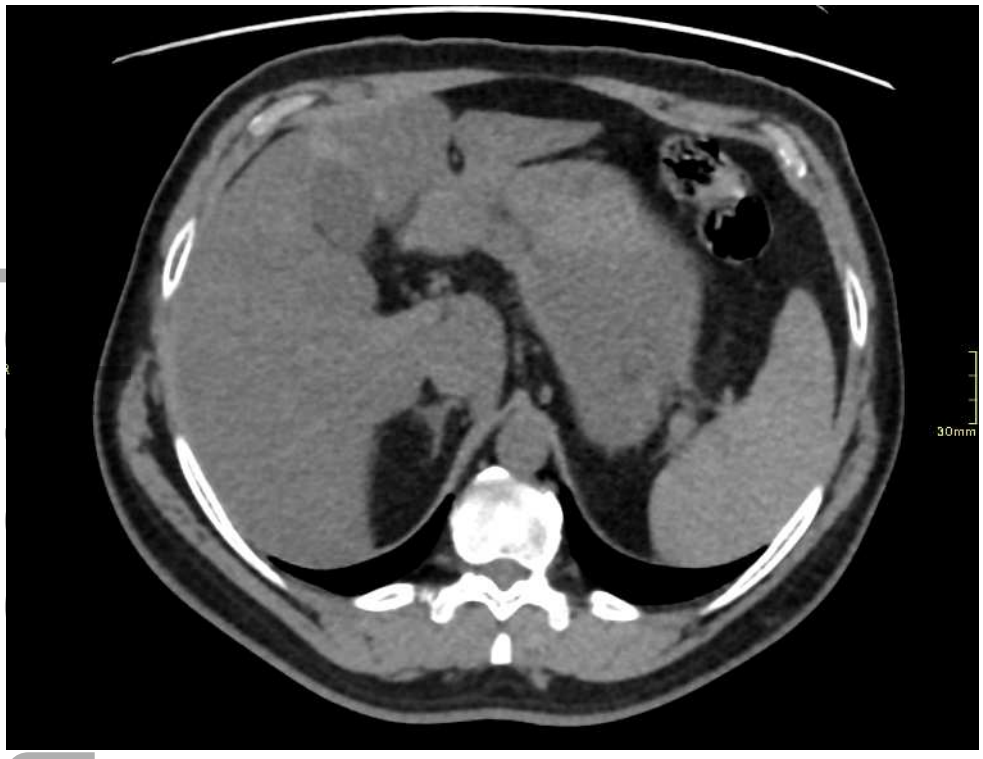

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