

Toward a comprehensive management strategy for incidental findings in imaging

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Increased use of cross-sectional imaging along with improved image quality and increased spatial resolution has led to an increase in the number of incidental findings (IFs) in radiology reports. *Incidental findings*, defined as findings that are unrelated to the clinical indication for the imaging examination performed, might pose special challenges for family physicians and their patients upon identification in an imaging report. Debates have long raged about overmanagement of diagnostic findings; in 1972, Rang described “Ulysses syndrome,” in which patients make “a long journey through the investigative arts and experience a number of adventures before reaching their point of departure once again,”¹ underscoring the fact that most IFs prove to be benign. Patients with IFs that have been unnecessarily investigated have been termed “victims of modern imaging technology (VOMIT),”² while the term “brainless application of radiological findings (BARF)” has been used to describe management of IFs.³ However, the possibility of an IF representing a serendipitous discovery for which prudent management would have clear clinical benefit that outweighs the potential harm suggests that a robust strategy for IFs is required.

Prevalence of IFs

Studies show that the prevalence of IFs in clinical and research settings is indeed substantial. In a systematic review of 44 studies evaluating the incidence of IFs in clinical populations, Lumberras et al found that IFs were identified in 31.1% of computed tomography (CT) examinations and in 8.7% of radiography examinations.⁴ Incidental findings consisted of “major” findings such as aortic aneurysms, solid hepatic masses, or lytic bone lesions; “moderate” findings such as Arnold-Chiari malformations, hepatic or vertebral hemangiomas, or splenomegaly; and “minor” findings such as arachnoid cysts, simple ovarian cysts, or small renal calcifications.⁴ In a retrospective review of 1426 patient images from a research population, IFs were identified in approximately 40% of all imaging examinations. The examinations yielding the highest prevalence of IFs were CT

of the abdomen and pelvis (in which an IF was identified in 60.9% of examinations), CT of the thorax (54.8%), and magnetic resonance imaging of the head (42.9%).⁵ As the prevalence of IFs increases with the age of the patient,⁵ and as Canada’s demographic profile shifts toward a higher median age, the potential impact of IFs will continue to increase.

Consistent approach to IFs

Incidental findings might lead to substantial adverse consequences for patients, such as complications from unnecessary biopsies or treatment, increased radiation from serial imaging, and increased patient anxiety and confusion. Incidental findings might distract clinicians from primary clinical concerns and increase their workload and the economic burden on the health system. Thus, IFs are increasingly seen as a systemic problem plaguing the health system and compromising patient care.

Opinions vary regarding how IFs should be reported, ranging from nondisclosure to full workup depending on the finding and characteristics. Studies show there is limited conformity regarding follow-up recommendations among radiologists.⁶ However, many IFs cannot simply be ignored. In a series of 1426 research imaging examinations, 567 examinations identified an IF, with 35 generating clinical action. Of these 35 cases, researchers determined that clinical action was of “clear medical benefit” in 6 cases, of “unclear medical benefit or burden” in 26 cases, and a “potential medical burden” in 3 cases.⁵ Thus, the possibility of a serendipitous discovery in which early detection improves the outcome obliges family physicians to have a consistent approach to IFs that balances the risks and benefits of management. We propose the following 3 imperatives.

The potential for IFs in any given imaging examination should be anticipated and discussed with patients. Data from prevalence studies should be used to determine the potential for IFs for a given imaging modality and to educate patients on the possibility of an IF. Use of graphs and visual displays can be helpful in facilitating discussions with patients about the probability of an IF being identified and, recognizing time constraints in busy practices, decision aids or information sheets that explain in plain language the risks and benefits of being informed about specific types of IFs should be developed to allow patients to better appreciate and be prepared for IFs.⁷ Family physicians should also discuss how IFs will be disclosed and

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determine patients' preferences for the level of information they wish to receive if an IF is identified. These simple discussions before imaging might create less anxiety for both family physicians and patients if an IF is subsequently identified.

Family physicians should be aware of existing clinical guidelines for management of IFs and use these as a basis for patient-centred discussions about subsequent workup of IFs. Some of the first approaches to IFs on cross-sectional imaging include the 1982 recommendations for nonfunctioning adrenal masses by Glazer et al⁸ and Bosniak's classification of renal cysts in 1986.⁹ The Fleischner Society criteria for management of pulmonary nodules have become among the most well established imaging guidelines since being introduced in 2005.¹⁰ The latest important approaches to IFs have been outlined in the white papers of the American College of Radiology, published in 2010,¹¹ 2013,¹² and 2015,¹³ which provide recommendations for managing common IFs on body CT and magnetic resonance imaging. While the American College of Radiology committee's goal was not necessarily to minimize the extent of follow-up of IFs, a subsequent study has shown that radiologists who read the 2010 white paper are less aggressive in recommending follow-up imaging.¹⁴ Familiarity with these guidelines will help ensure patients and clinicians are able to make evidence-based decisions regarding potential workup and follow-up, ensuring patient care is optimized and minimizing risk of litigation. However, we must emphasize that while numerous guidelines exist to aid clinicians in managing IFs, further studies to better understand the clinical relevance of asymptomatic findings are required to broaden the evidence on which these guidelines are based. Additionally, various groups, such as the PROVIDI (Prognostic Value of Unrequested Information in Diagnostic Imaging) Study Group, have investigated the value of commonly observed IFs, including white-matter hyperintensities and coronary and aortic calcifications, as novel prognostic markers.¹⁵ An important goal for the next decade must be to broaden our evidence base to cost-effectively use the increasing amount of potentially valuable information obtained from imaging studies.

Clear lines of responsibility and communication should be in place for managing and following up IFs in hospitals and consultant and family practices. While much of the literature addresses overmanagement of IFs, multiple studies have shown low follow-up rates for IFs even for potentially serious findings.¹⁶⁻¹⁸ In hospitals, quality improvement measures such as creation of an "IFs coordinator" or delegation to mid-level providers have been effective in increasing rates of patient notification, follow-up, and hospital record documentation.¹⁹

An automated system that generates and transmits a report specific to each IF directly to the electronic medical record has also been helpful in communicating IFs to patients and clinicians.²⁰ Each institution, department, or consultant practice requesting imaging must have procedures in place so that IFs are managed before patient discharge, patients are referred to another specialty practice, or family physicians are requested to manage potentially important IFs. While primary responsibility for managing IFs initially rests with the physician who ordered the imaging study, owing to the unique longitudinal relationship patients have with their family physicians, family physicians also have an important role in the management of IFs in imaging studies ordered in hospital or by other specialists. Thus, we suggest family physicians should be the champions to ensure that potentially serious IFs are appropriately managed. Integration of follow-up notifications into electronic medical records will help ensure follow-up imaging at necessary intervals, potentially easing the burden on family physicians as "quarterbacks" for their patients. Special care must be taken with patients who might not have a relationship with a family physician, in which case it is essential to ensure a diagnostic or treatment plan is in place with patients before discharge.

Conclusion

With inconsistent approaches to management of IFs, patient care is compromised by either overmanagement or undermanagement and excessive economic burden is placed on the health care system. Family physicians, as the most responsible providers in the Patient's Medical Home,²¹ are well positioned to inform patients of the potential of IFs, determine patient preferences, and lead appropriate management and follow-up plans in collaboration with radiologists and other specialists. Family physicians should work as a community to develop a set of tools for approaching IFs and encourage a uniform set of recommendations in collaboration with the medical imaging community such that a cohesive strategy for management of IFs is agreed upon by family physicians, radiologists, and other specialists. If a dedicated and reliable approach to IFs is established, we believe specific IFs on imaging reports can provide valuable prognostic and diagnostic information that can be used to improve patient care. 

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Competing interests

None declared

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