

Survey on Current Practice of Canadian Physicians Regarding the Investigation in Older Patients with Delirium



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ABSTRACT

Background

The current literature provides heterogeneous recommendation regarding the investigation of older delirious patients, which may lead to over-testing. Our study aims to describe Canadian physicians' current practice for the investigation of older patients with delirium. Our secondary objective is to define specific indications for performing a CT head scan in this population.

Methods

Design: cross-sectional online survey. Participants: physicians who conduct their clinical practice in Canada and who care for older patients with delirium. Potential study participants were reached through Canadian associations: Canadian Geriatrics Society, the Canadian Association of Emergency Physicians, the Association des Médecins d'Urgence du Québec, and members of Choosing Wisely Canada.

Results

We received 296 survey responses. More than 80% of respondents always order complete blood count, urea, and creatinine and electrolytes. Extended electrolytes, TSH, chest X-ray, electrocardiogram, urinalysis and urinary culture tests tend to be ordered somewhat frequently. Physicians mostly agreed to order a head CT scan for loss of consciousness, altered mental status, fall, and anticoagulation.

Conclusions

Physicians' investigations for older patients with delirium are highly variable, even with the lack of evidence supporting a broad workup. Also, respondents mostly align with current recommendations of indications for CT head scans.

Key words: delirium, older patients, geriatric

INTRODUCTION

Delirium is defined as an acute onset of confusion with a fluctuating course. It is characterized by a disturbance in consciousness, attention, orientation, memory, thought, perception, and behaviour, and is a frequent geriatric syndrome.⁽¹⁾ The incidence of this condition increases with age, and the growing population of older adults will inevitably lead to an increase of delirium cases in the coming years.⁽²⁾ Delirium can be triggered by various factors including infections, pain, medication, dehydration or constipation, to name a few.⁽²⁻⁴⁾ The cause of delirium is often established as multifactorial. Assessing symptoms for these patients tends to be difficult due to the confusion, and physicians must conduct investigations to try to determine the cause of this delirium.^(3,4) Initial investigations are ordered by physicians to rule out medical conditions that may explain the confusion.

Some organizations or institutions have their own protocols for physicians to suggest initial workup for delirious patient—but otherwise, each physician has a different approach for investigating delirium.^(3,5) These initial workup suggestions are usually the result of expert consensus, case reports or extrapolation from other recommendations, often without clear literature supporting each investigation.⁽⁶⁾ In Canada, the most recent investigation guidelines were proposed by the Canadian Coalition for Seniors' Mental Health in 2006 and updated in 2014: complete blood count, biochemistry (calcium, albumin, magnesium, phosphate, creatinine, urea, electrolytes), liver function tests (ALT, AST, bilirubin, alkaline phosphatase), glucose, thyroid function tests (TSH), blood culture, oxygen saturation, urine culture, chest X-ray, and electrocardiogram (ECG).⁽⁴⁾ Other organizations suggest additional investigation with laboratory tests, chest X-ray, ECG, EEG, and neuroimaging only if no potential trigger factor is identified.⁽⁷⁾ These recommendations are all made by expert committees.

In 2010, the National Institute for Health and Care Excellence (NICE) conducted a large literature review and a meta-analysis on the risk factors of delirium. Their main results concluded that a search for infection should be performed, but the results for urea/creatinine or electrolyte disturbances were inconsistent due to poor study design.⁽⁸⁾ Even if laboratory testing is useful, there is no strong evidence supporting other workup, and clinical judgment should be applied.⁽⁹⁾

Head computed tomography scans are another controversy in the initial management of delirium. Some authors recommended against its routine use because of its low yield in finding significant abnormalities.⁽¹⁰⁾ Only a few specific indications justify its use, such as focal neurological signs, a history of falls or an impaired level of consciousness.⁽¹¹⁾ Recommendations from the Canadian Coalition for Seniors' Mental Health are similar, targeting indications of a focal neurological sign or head injury and evidence of raised intracranial pressure on examination.⁽⁴⁾

The current literature provides no clear recommendation regarding the investigation of older patients with delirium, and this may lead to over-testing. Heterogeneous recommendations may lead to disparities in clinical practices. Our study aims to describe Canadian physicians' current practice for the investigation of older patients with delirium. Our secondary objective is to define specific indications for performing a CT head scan in this population.

METHODS

Study Design & Participants

This is a subanalysis of a larger cross-sectional survey of Canadian emergency physicians, family physicians, internists, geriatricians, infectious disease specialists, and residents that was conducted between January 20 and March 1, 2020.⁽¹²⁾ In order to be included in this study, physicians had to 1) conduct their clinical practice in Canada; 2) be able to speak French or English; and 3) care for older patients with delirium in their current practice.

Survey Distribution

The survey was distributed via the following widely known Canadian organizations: the Canadian Association of Emergency Physicians (CAEP) (1,525 members), the Association des Médecins d'Urgence du Québec (AMUQ) (1,200 members), the Canadian Geriatrics Society (CGS) (350 members), and Choosing Wisely (250 members). The survey was also distributed to primary care colleagues working within Université Laval's network (50 professionals). Members of these groups received an introduction email which explained the study's objective and contained a link to the online REDCap survey. Three reminders (at two-week intervals) were sent by CAEP and AMUQ. CGS and Choosing Wisely were able to send the invitation only once.

We used a convenience sample for this study due to ethical and confidentiality reasons, as the targeted medical

associations are not allowed to share their members' contact information. This study was approved by the CHU de Québec-Université Laval Research Ethics Board (#2020-4911).

The Survey

The online survey was designed by two of the study authors (AL & ME). A pilot survey was distributed to a steering committee of four physicians from different specialties (geriatric care, family medicine, and emergency medicine). They assessed the survey for construct validity, content validity, and face validity, and their feedback led to the creation of the final survey.⁽¹³⁾ Both versions (French and English) were reviewed by bilingual medical experts (MÉ, CM, PJ & KY).

The first question aimed to ensure participants met the inclusion criteria. The first section of the survey aimed to describe participants' initial assessment of a delirious patient using a five-point Likert scale ranging from "never" to "always" for each investigation. This section also included a specific multiple-choice question about situations for ordering a head CT scan for delirious patients, and a comment section was available to the study participants. Socio-demographic information was also collected.

Patient & Public Involvement

Patients or the public were not involved in the design or the conduct of this study.

Statistical Analysis

Descriptive statistics were computed for socio-demographic characteristics, and investigations and decisions for treatment. We sorted investigations into five categories according to mean and median score. Means, medians, and proportions were calculated when appropriate. We used two-sided chi-square tests to determine if there was a difference for questions with multiple variables. Thematic content analyses were performed for qualitative information from text boxes. Statistical analyses were performed using IBM SPSS Statistics 25 software [IBM SPSS Statistics, Armonk, NY].

RESULTS

Participants

The survey was sent to approximately 3,375 physicians across Canada, and 301 responded to the survey. Five of those respondents did not meet our inclusion criteria and were therefore removed from our analyses, leaving us with a sample of 296 participants. Our participants were divided as follows: 114 (38.6%) were family physicians, 147 (49.8%) were emergency physicians, and 10 (3.4%) were residents of these specialties. A total of 4 (1.4%) internists, 2 (0.7%) infectious disease specialists, and 13 (4.4%) geriatricians also participated. Most of our respondents were from Quebec (48.8%) and Ontario (26.1%), but Alberta (9.2%) and British Columbia (7.1%) were also represented. Over 50% of our participants had more than 10 years of clinical experience, 45.6% were working

in an academic teaching hospital, and 69.6% of participating physicians cared for delirious patients on a regular basis (at least once a week). Table 1 shows a full breakdown of our participants' socio-demographic characteristics.

The survey let physicians detail their initial investigations for afebrile patients with delirium. We were able to identify the type and frequency of initial investigations performed by the majority of physicians for patients with delirium. More than 80% of physicians always order complete blood count (CBC), urea and creatinine and electrolytes (Na-K-Cl). Extended electrolytes (Calcium-Magnesium-Phosphorus), TSH, chest X-ray, electrocardiogram (ECG), and urinalysis and urinary culture tests tend to be ordered somewhat frequently. Liver function tests (AST/ALT, GGT/PAL, Bilirubin), head CT scans, and troponin tests are sometimes ordered, but not as frequently as those previously mentioned. Abdominal X-ray and B12 are rarely ordered. Only blood culture is never or rarely ordered by physicians in these proposed choices. The distribution for urine dipstick testing is too wide to be categorized in one group. Table 2 shows the detailed frequency for each investigation.

The comment section revealed multiple suggestions, including venous blood gas, bladder scan, rectal examination, CRP, and medication dosing, if possible. Medical review and drug level testing when possible were also identified by some participants.

Physicians mostly agreed with the suggested criteria for ordering a head CT scan, except for minor head trauma (Figure 1). Loss of consciousness, altered mental status, fall, and anticoagulation were all pertinent criteria for ordering a head CT for almost 70% of respondents. An abnormal neurological examination was a nearly unanimous criterion for physicians. Only 14 (4.7%) physicians said they order head CT scan for all delirious patients.

Our respondents suggested a number of other criteria for ordering a head CT scan for delirious patients in the comment section, including no other cause of delirium found, acute onset, and a combination of head trauma and anticoagulation.

DISCUSSION

Interpretation of Findings

This is the first Canadian cross-sectional survey assessing the current practice of a multidisciplinary group of physicians with regard to the investigation of older patients with delirium. Heterogeneous recommendations from different associations may lead to conflicting information and to over-testing. Indeed, our results show that the majority of physicians will order broad imaging and laboratory tests for delirious patients, including CBC, urea and creatinine, electrolytes (Na-K-Cl), Calcium-Magnesium-Phosphorus, TSH, chest X-ray, electrocardiogram (ECG), urinalysis and urinary culture.

Comparison to Previous Studies

After the NICE guidelines were published in 2010, a 2014 meta-analysis reviewed risk factors for delirium. The

authors found that abnormal sodium is the main electrolyte disturbance studied and that it increased the risk of delirium. However, they found no evidence for the involvement of other electrolytes. An abnormal urea/creatinine ratio and a low hematocrit were also associated with an increased risk, so the investigations frequently ordered by participating physicians were found to be well-aligned with the literature.⁽¹⁴⁾ Other than these tests, there is no other robust evidence, and most existing recommendations originate from expert committees based on case reports or extrapolation from other recommendations. For example, TSH may be associated with cognitive impairment, but its connection to delirium is unclear.⁽¹⁵⁾ Another questionable procedure is troponin testing. In fact, a recent study suggests troponin dosing is not useful in non-specific complaints, and that delirium is not a standard presentation of acute coronary syndrome.⁽¹⁶⁾

TABLE 1.
Description of population

<i>Characteristics</i>	<i>N (%)</i>
Province (n=296)	
Quebec	144 (48.8)
Ontario	77 (26.1)
Alberta	27 (9.2)
British Columbia	21 (7.1)
Manitoba	9 (3.1)
Nova Scotia	9 (3.1)
Saskatchewan	2 (0.7)
P-E-I	2 (0.7)
Newfoundland and Labrador	2 (0.7)
Northern Territories	1 (0.3)
Yukon	1 (0.3)
New Brunswick	0 (0)
Nunavut	0 (0)
Specialty (n=293)	
Emergency medicine	146 (49.8)
Family physicians	118 (40.3)
Internal medicine	4 (1.4)
Geriatrician	13 (4.4)
Resident	10 (3.4)
Infectious disease specialist	2 (0.7)
Years in Practice (n=292)	
<10	141 (47.6)
10–19	65 (22)
≥20	86 (29.1)
Settings of Practice (n=294)	
Academic Teaching Hospital	134 (45.6)
Community / District General Hospital: Teaching	112 (38.1)
Community / District General Hospital: Non-Teaching	39 (13.3)
Long-term care facilities	9 (3.1)
Frequency Investigating Delirium	
Few times a year	18 (6.1)
Few times a month	72 (24.3)
Each week	206 (69.6)

Currently available guidelines provide variable recommendations, which may lead to unexpected results.⁽¹⁷⁾ Abnormal results from these investigations are not necessarily the cause of delirium. This can encourage unnecessary treatments with risks of complications. The underlying cause of delirium is the treatment priority, and non-pharmacological measures should be first-line treatment for delirious patients.⁽¹⁸⁾ This low level of evidence for the relevance of blood

tests shows the importance of looking for other causes, such as urinary retention, constipation, pain medications, and environmental factors.

This study targets afebrile patients because the management of possible septic patients is different, and conducting an extensive workup is normal in these situations. Despite this, many physicians search for infection with chest X-ray, urinalysis and urine culture—probably because sepsis

TABLE 2.
Initial assessments with delirious non-septic patients by physicians

	n (%)				
	Never	Rarely	Sometimes	Frequently	Always
CBC	1 (0.3)	2 (0.7)	6 (2.0)	46 (15.6)	240 (81.4)
Urea-creatinine	0 (0)	4 (1.4)	8 (2.7)	40 (13.7)	241 (82.3)
Electrolytes (Na-K-Cl)	0 (0)	3 (1.0)	8 (2.7)	40 (13.6)	243 (82.7)
Extended electrolytes (Ca-Mg-PO4)	6 (2.1)	32 (11.0)	75 (25.8)	79 (27.1)	99 (34)
TSH	8 (2.7)	43 (14.7)	75 (25.6)	91 (31.1)	76 (25.9)
Chest X-Ray	2 (0.7)	25 (8.6)	94 (32.4)	91 (31.4)	78 (26.9)
Electrocardiogram (ECG)	9 (3.1)	32 (11.0)	51 (17.5)	94 (32.2)	106 (36.3)
Urinalysis	8 (2.7)	22 (7.5)	55 (18.8)	81 (27.6)	127 (43.3)
Urinary culture	0 (0)	35 (12.0)	84 (28.8)	87 (29.8)	86 (29.5)
Liver function tests	5 (1.7)	36 (12.3)	128 (43.8)	71 (24.3)	52 (17.8)
Troponin	13 (4.5)	50 (17.2)	88 (30.2)	73 (25.1)	67 (23.0)
Head CT	13 (4.5)	32 (11.0)	112 (38.4)	120 (41.1)	15 (5.1)
Vitamin B12	75 (25.7)	75 (25.7)	72 (24.7)	41 (14.0)	29 (9.9)
Abdominal X-ray	53 (18.3)	134 (46.4)	83 (28.7)	16 (5.5)	3 (1.0)
Urine dipstick	116 (40.4)	25 (8.7)	30 (10.1)	40 (13.9)	76 (26.5)
Blood culture	99 (34)	116 (39.9)	54 (18.6)	11 (3.8)	11 (3.8)

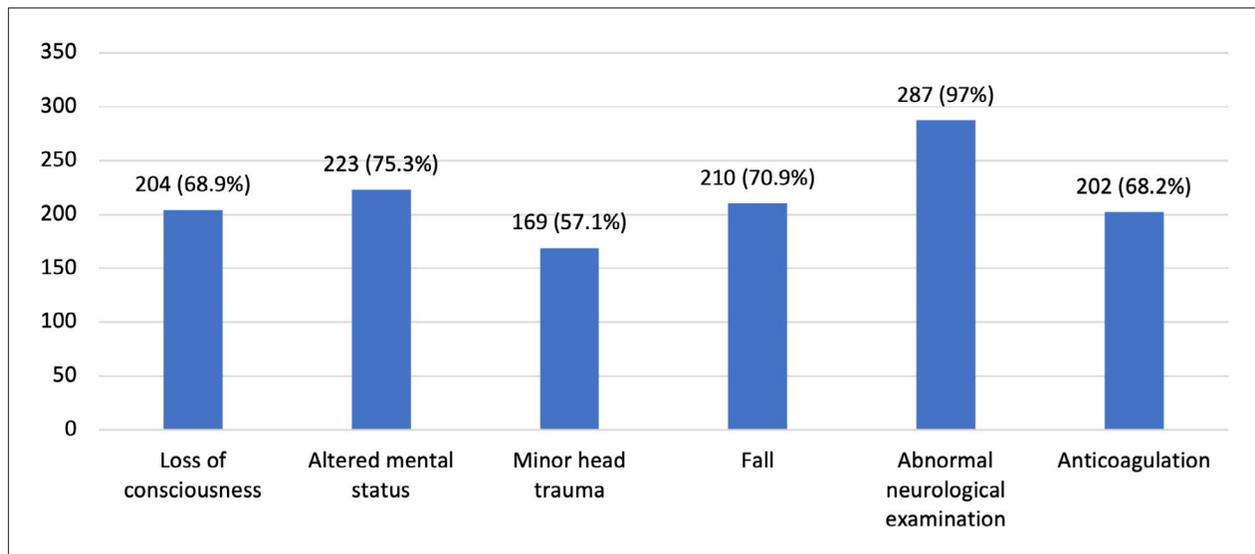


FIGURE 1. Indication for head CT scan for delirious patient reported by physicians (n=296).

is more insidious in older patients, and their degree of fever is not the same as that in the general population.⁽¹⁹⁾ This may explain the extensive workup for a number of older adults.

This survey also assessed the indication for ordering head CT scans in delirious patients. Head CT scans are not recommended for delirious patients due to their low yield.⁽²⁰⁾ Choosing Wisely has also made a statement urging physicians to consider head CT scans only for patients with selected risk factors for intracranial causes like recent head trauma or fall, new focal neurological findings, and sudden or prolonged decreased level of consciousness.⁽²¹⁾ In our survey, almost all physicians reported that they do not order head CT scans for all patients. On the other hand, the two people who never order head CT scans were from Northwest Territories and were working in long-term care. For proposed indications, around 70% of physicians tend to follow these recommendations. This survey highlights the judicious use of head CT scans and the trend by which most physicians are reducing the number of imaging procedures for delirious patients. Other criteria suggested by physicians were also appropriated, like the combination of head trauma and anticoagulation. However, some physicians suggested scanning patients if no other cause for delirium is found. This suggestion is quite interesting, since delirium alone is not a recognized criterion for the need to undergo a head CT scan, but no study has looked at delirium without etiology.⁽²²⁾

Strengths & Limitations

There are some limitations in this study. First, the response rate cannot be calculated because our survey was distributed through medical associations. Some physicians may be members in more than one, and associations were not allowed to share their members' contact information. We assumed that physicians did not answer a specific survey like this one twice. In addition, not all physicians hold memberships to our chosen associations, which may limit the extrapolation of our results. Members of associations are probably more inclined to stay up to date and to show more interest in clinical guidelines. Non-response bias needs to be considered in this type of study. Furthermore, our limited number of participants in different specialties did not allow for specialty-stratified analyses. This outcome was predictable considering the large number of members in emergency medicine associations. Also, this study may be overestimating the number of physicians who conduct an extensive initial workup, considering most participants work in the emergency department. In this setting, observation may be difficult, as quick and efficient decisions must be made to direct patients.

However, our study has several non-negligible strengths. First, our survey was built and validated by a team of experienced clinician—scientists. To promote participation, it consisted of short, concise, and precise questions. Furthermore, we included open comment sections which allowed physicians to express their opinions. Our anonymous nationwide survey is a good way to let respondents express their thoughts without being influenced by others. Another

strength is the wide range of experience of our participants, half of whom were in their first years of practice and the other half of whom were more experienced. The validation of internal consistency with clinical cases reinforces the results of our study.

Clinical Implications

This survey is a first step to demonstrating discrepancies and heterogeneity in current practices for the management of delirious patients. Physicians should be more specific in their investigations because of the lack of evidence for the utility of an undifferentiated workup. In the future, a specific study on precipitating factors detected by blood tests or investigations should be conducted to establish relevance for initial workup taking into account the last systematic review. In recent years, studies have demonstrated the low yield of head CT scans for all delirious patients. With this in mind, it may be time to better select investigations for delirious patients and focus on potential causes.

Research Implications

The literature on the impact of delirium workup is scant. This survey highlights the heterogeneous management of this population by Canadian physicians. This study provides evidence that further research is needed to determine which investigations are evidence-based.

CONCLUSION

Physicians' decisions to initiate investigations for older patients with delirium are highly variable, even with the lack of evidence supporting a broad workup. Also, respondents mostly align with current recommendations of indications for CT head scans. Clear guidelines must be developed and implemented to improve the investigation and subsequent management of acute delirium.

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Not applicable.

CONFLICT OF INTEREST DISCLOSURES

The authors declare that no conflicts of interest exist.

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