Potential triaging of referrals for lumbar spinal surgery consultation: a comparison of referral accuracy from pain specialists, findings from advanced imaging and a 3-item questionnaire

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Background: Waiting times to see a spinal surgeon are among the highest in Canada. However, most patients who are referred would not benefit from surgical care. Effective triaging of surgical candidates may reduce morbidity related to prolonged waiting times and optimize use of limited resources.

Methods: We administered a questionnaire consisting of 3 items identifying leg-dominant or back-dominant pain among 119 consecutive patients who presented at a community spinal pain centre or a spinal surgical unit for assessment of an elective lumbar problem. We analyzed the questionnaire under 2 different scenarios: 1 hypothesized to be more sensitive and 1 hypothesized to be more specific.

Results: For the "sensitive" scenario of clearly back-dominant pain, the sensitivity of the questionnaire was 100% in identifying appropriate surgical candidates. For the "specific" scenario of leg-dominant pain, the questionnaire had a sensitivity of 83% and specificity of 73% in identifying appropriate surgical candidates, which was significantly superior to findings on computed tomography or magnetic resonance imaging (i.e., presence of neurocompressive lesions). When comparing the accuracy of the questionnaire in identifying appropriate surgical candidates to that of an assessment performed by a pain specialist at an acute spinal pain clinic, we found no statistically significant differences between the 2 methods.

Conclusion: Use of the questionnaire when triaging patients may decrease the number of unnecessary referrals to spine surgeons. Adopting such a method of triaging could reduce waiting times for appropriate surgical candidates and potentially improve the outcomes of any resulting spinal surgery performed in a timely fashion.

Contexte : Les temps d'attente pour consulter un chirurgien de la colonne sont parmi les plus longs au Canada. La plupart des patients référés ne bénéficieraient toutefois pas de soins chirurgicaux. Un triage efficace des candidats à l'intervention chirurgicale pourrait réduire la morbidité reliée aux attentes prolongées et optimiser l'utilisation de ressources limitées.

Méthodes : Nous avons administré un questionnaire à 3 items pour identifier la douleur dominante dans la jambe ou dans le dos chez 119 patients consécutifs qui se sont présentés à un centre communautaire de traitement de la douleur de la colonne ou à une unité de chirurgie de la colonne pour évaluation d'un problème lombaire électif. Nous avons analysé le questionnaire suivant 2 scénarios différents : le premier était censé être plus sensible et l'autre, plus spécifique.

Résultats : Dans le scénario «sensible» de la douleur clairement dominante au dos, le questionnaire a présenté une sensibilité de 100 % pour identifier les candidats appropriés à une intervention chirurgicale. Dans le cas du scénario «spécifique» de la douleur dominante à la jambe, le questionnaire a présenté une sensibilité de 83 % et une spécificité de 73 % pour identifier les candidats appropriés à une intervention chirurgicale, ce qui était significativement supérieur aux constatations de la tomodensitométrie ou de l'imagerie par résonance magnétique (c.-à-d. présence de lésions neurocompressives). Lorsque l'on a comparé l'exactitude du questionnaire pour identifier les candidats appropriés à l'intervention chirurgicale à celle d'une évaluation effectuée par un spécialiste de la douleur dans une clinique de traitement de la douleur aiguë de la colonne, nous n'avons constaté aucune différence statistiquement significative entre les 2 méthodes.

Conclusion : L'utilisation du questionnaire pour le triage des patients pourrait réduire le nombre de références inutiles aux chirurgiens de la colonne. L'adoption d'une telle méthode de triage pourrait réduire les temps d'attente pour les candidats appropriés à une intervention chirurgicale et pourrait améliorer les résultats de toute intervention chirurgicale à la colonne qui en découlerait et serait pratiquée en temps opportun.

Pain related to the lumbar spine has multiple potential etiologies, including degeneration of spinal elements and neurologic compression. It is one of the most common health problems for which people consult a physician, and it may result in significant morbidity for those afflicted. Although the severity of symptoms varies considerably, physical disability with psychosocial and economic consequences can occur, particularly in patients with chronic or severe conditions. It is not surprising then that many clinical practice guidelines have been published in recent years to inform primary care physicians and other clinicians on the appropriate management of patients with low-back pain.[1–4]

Despite recommendations from these guidelines about the benign natural history of most spinal conditions,[5,6] even the most efficiently managed spinal consultation services are frequently overwhelmed by large numbers of referred patients with nonspecific low-back pain who do not actually require tertiary investigation or surgical intervention. These high referral rates to spinal surgeons are exacerbated by false-positive findings on technologically advanced but inappropriately ordered imaging studies such as computed tomography (CT) or magnetic resonance imaging (MRI) scans.[7–12] As a result, waiting times for consultations with a spinal surgeon are among the longest of any specialty in Canada; the average waiting time is more than 7 months from initial referral to consultation.[13] This delay is much longer than the 6 weeks previously deemed appropriate.[14] Furthermore, lumbar spine pathology that is amenable to surgical intervention is often "time-sensitive," and recent evidence has demonstrated that prognosis deteriorates as patients languish on waiting lists.[15]

Among patients presenting with low-back pain who require urgent referral to a specialist, primary care clinicians can generally recognize red flags such as progressive neurologic deficit and fractures.[16] However, in the absence of red flags, more difficulty arises when attempting to distinguish patients who may be amenable to surgical intervention from those who are not.[17–23] Given the large volume of referrals, many Canadian spinal surgeons attempt to triage the referral letters to prioritize patients who may benefit most from their surgical services.

A recent review of referrals to multiple Canadian surgeons demonstrated that most of these referrals lacked adequate clinical information for triage.[24] Many of the factors used in surgical decision-making (e.g., dominant location of pain, severity of symptoms, neurologic findings, duration of symptoms, previous treatment) can be easily elicited. However, less than 1% of referral letters contained information on all 5 of these factors and almost 25% of all referral letters failed to mention any of them. In addition, there was practically no agreement between information provided in the referral letter and actual clinical findings noted in the surgical consultation, with κ values of less than 0.2 for these factors.

Consequently, most patients ultimately evaluated by spinal surgeons are not considered appropriate surgical candidates and do not benefit from the surgeons' expertise in surgical management.[25,26] In addition, a substantial number of these patients languish on surgeons' consultation waiting lists without receiving other more appropriate nonoperative treatment options.[26] Identifying appropriate surgical candidates and minimizing the number of unnecessary referrals may help reduce waiting times for surgical consultation for patients who may benefit from spinal surgery and potentially redirect nonsurgical candidates for more appropriate treatment earlier. To date, there has been little research evaluating the effectiveness of triaging referrals for spinal surgery consultations.

We sought to evaluate and compare 3 possible triage mechanisms to identify patients with low-back pain who require a surgical consultation. The triage mechanisms were

- a 3-item questionnaire to identify back-dominant pain versus leg-dominant pain,
- findings on CT or MRI scans, and
- assessment by pain specialists at an acute spinal pain centre.

Our primary hypothesis was that the 3-item questionnaire would be more accurate than the other 2 triage mechanisms.

Methods

After approval by our institutional ethics review board, we performed an observational study in an academic tertiary care spine surgery centre and an affiliated community-based secondary acute spinal pain clinic.

Study population

We considered consecutive patients to be eligible for inclusion if they were referred for assessment of a lumbar spine problem in either the tertiary or secondary setting. Exclusion criteria for this study were

- primary spinal tumour, spinal metastases, spinal fractures or spinal infection;

- previous spinal surgery;
- no available lumbar CT or MRI scan at consultation; and
- inability to return for follow-up after 1 year.

The tertiary care setting population included 61 consecutive and consenting patients presenting to an academic spine clinic who met the inclusion/exclusion criteria for the study. These patients were referred from another physician (e.g., general practitioner or other nonsurgical specialist), as per usual referral procedures, to 1 of 3 fellowship-trained spinal surgeons for a lumbar spine problem.

The secondary care setting population included 58 consecutive and consenting patients presenting to an established community-based acute spinal pain clinic for assessment of a lumbar spine problem. Patients were referred to the clinic by another physician (e.g., general practitioner or emergency department physician) and had acute or subacute (less than 6 months' duration) lumbar pain. The acute spinal pain triage staff and spinal surgeons met to develop a triage flow algorithm and management plan for various presentations of lumbar pain. The algorithm included instructions about the characteristics of an appropriate referral to a spinal surgeon (e.g., objective neurologic loss, leg-dominant symptoms). The pain specialists working at the acute spinal pain triage clinic included anesthesiologists, physiatrists and general practitioners who devoted a substantial component of their practices to outpatient pain management.

Evaluations occurred in the acute spinal pain triage clinic for all patients within 2 weeks of a request for an assessment. Patients referred by the acute spinal pain triage clinic to the tertiary care setting were given high priority on the surgeons' consultation waiting lists.

Screening questionnaire

At the initial assessment, patients completed a 3-item questionnaire (Box 1) to establish whether their pain symptoms were back-dominant (i.e., generally considered inappropriate for surgical evaluation or intervention) or leg-dominant (i.e., generally considered appropriate for surgical evaluation or intervention). A fellowship-trained spinal surgeon with graduate training in clinical epidemiology (E.W.) designed the questionnaire based on criteria previously identified in the literature as potential predictors of appropriate surgical referral for patients with low-back pain.[17] In a previous study, 63 consecutive patients attending outpatient clinics for assessment of lumbar spine problems evaluated the test–retest reliability of 8 different methods or questions commonly used to identify leg-dominant pain.[17] The 3 items selected for the triage questionnaire in the present study have been demonstrated to be the most reliable in identifying leg-dominant or back-dominant pain and also the most consistent with surgeons' assessments. Moreover, the combined responses from these 3 questions were able to identify all patients who reported an aspect of leg-dominant pain. Patients completed the questionnaires immediately before seeing the surgeon (tertiary care setting) or the pain specialist (secondary care setting). When selecting appropriate surgical candidates, surgeons were blinded to the results of the 3-item questionnaire.

Radiological assessment

Patients in both phases of the study had a CT or MRI scan performed before the initial assessment. A spinal surgeon and a registered nurse reviewed the radiological reports independently to determine whether any comment by the radiologist on a neurocompressive lesion existed; discrepancies were resolved by consensus. Both assessors were blinded to the results of the 3-item questionnaire and to whether that patient required surgery.

Need for surgery

One year after the initial assessment and administration of the 3-item questionnaire, a spinal surgeon (E.W.) and a registered nurse reviewed the hospital medical records of all patients independently; discrepancies were resolved by consensus. Both were blinded to the results of the 3-item questionnaire and attempted to determine whether lumbar spine surgery had been performed or recommended by a spinal surgeon in the previous 12 months. Privacy issues prevented the research team from contacting patients for follow-up regarding further surgery. However, as the study hospital is the only one offering spinal surgical services in the geographic catchment region with a population of

Box 1. Back- versus leg-pain questionnaire

Q1. Over the past 4 weeks, please rate the pain in your

	None	Minimal		Mild		Moderate		Severe		Excruciating
	0	1	2	3	4	5	6	7	8	9	10
Lower back	__	__	__	__	__	__	__	__	__	__	__
Right leg	__	__	__	__	__	__	__	__	__	__	__
Left leg	__	__	__	__	__	__	__	__	__	__	__

Q2. If you could have treatment directed at the pain in 1 area, which would it be?

__ Low back
__ Leg (s)

Q3. Which situation describes your pain over the past 4 weeks the best?

__ 100% of pain in the low back and no leg pain
__ 80% of the pain in the low back and 20% in the leg(s)
__ 60% of the pain in the low back and 40% in the leg(s)
__ 50% of the pain in the low back and 50% in the leg(s)
__ 40% of the pain in the low back and 60% in the leg(s)
__ 20% of the pain in the low back and 80% in the leg(s)
__ No low-back pain and 100% of the pain in the leg(s)

Scoring

Clearly back-dominant: all 3 questions are back-dominant

Indeterminate: at least 1 question has equal back and leg pain (e.g., back = 8/10, leg = 8/10) and no leg-dominant pain

Leg-dominant: at least 1 question is leg-dominant

about 1.5 million people, it is unlikely that patients underwent surgery at a different site.

Analysis

For the 3-item questionnaire, we divided patients into 3 groups: back-dominant pain (answered back-dominant pain on all 3 questions), leg-dominant pain (at least 1 question with a leg-dominant pain response) and indeterminate pain (all other responses). We considered 2 screening scenarios separately in the analysis. We hypothesized that the first was highly specific because we included only patients with leg-dominant pain and that the second was highly sensitive because we excluded only patients with clearly back-dominant pain (Box 1). We then calculated the sensitivity and specificity of the questionnaire's ability to identify appropriate surgical candidates based on these 2 scenarios. Using Pearson χ^2 analysis or Fisher exact tests, we compared the results of the 3-item questionnaire with those 2 scenarios against the sensitivity and specificity derived from CT or MRI scans (i.e., presence of neurocompressive lesion) or referrals for surgical consultation from pain specialists at the secondary care acute spinal pain triage clinic. Since there were no significant differences in the calculated sensitivity or specificity of either the questionnaire or CT or MRI findings between the tertiary and secondary care settings for each of the 2 scenarios considered, we combined results from the 2 settings for the final analyses.

RESULTS

Baseline features

We included a total of 119 patients from both the tertiary care and secondary care settings in our analyses. The mean age was 48.9 (range 18–86) years, and the mean numerical pain rating score from the questionnaire was 7.4 (standard deviation [SD] 2.0) out of 10. Ninety-three patients (78%) had evidence of lumbar neurocompressive lesions on CT or MRI scan. Thirty-eight patients (32%) had clearly back-dominant pain as per the questionnaire, and 42 (35%) had elements of leg-dominant pain; the remaining 39 patients (33%) had indeterminate pain.

There were no significant differences between the patients in the tertiary care and secondary care settings in terms of demographic or clinical characteristics other than the duration of symptoms, which tended to be longer in patients from the tertiary care setting (Table 1). It should be noted that whereas the mandate of the acute spinal pain clinic was to see "acute" patients, there were no attempts, other than from the initial referral notes, to control the types of patients seen. Although patients with chronic spinal pain were also assessed in the secondary care setting, more than 80% of these patients presented with acute exacerbations of chronic complaints; such temporal pain patterns are common among patients with low-back pain and make the application of rigid inclusion or exclusion criteria for research purposes challenging.

Need for surgery

At 1-year follow-up, 11 patients from the tertiary care setting (18%) and 7 (12%) from the secondary care setting were offered or had undergone a surgical procedure for the lumbar spine. The overall rate of surgical intervention or recommendation for surgery in the 2 settings combined was 15% (18/119). Eight patients underwent or were recommended for discectomy procedures for sciatica; 5 for laminectomy or laminotomy procedures for claudication related to spinal stenosis; and 5 for fusion procedures for spinal stenosis and instability related to spondylolisthesis, degenerative scoliosis or facet arthropathy. There were no significant differences in types of surgeries between groups. Triage results are presented in Figure 1 and in Table 2 and Table 3 for the tertiary setting and secondary setting, respectively. The tables also present the sensitivity, specificity and positive and negative predictive values for the 2 different "cut-off" scenarios considered with the questionnaire as well as the use of CT or MRI scans and secondary care pain specialist assessments to identify appropriate surgical candidates.

For the first scenario (i.e., clearly back-dominant pain) using the questionnaire, hypothesized to be "highly sensitive," the combined sensitivity from both tertiary and secondary referral settings was 100%. Under this scenario, the questionnaire was as sensitive as the CT or MRI scans in ruling out the need for surgical intervention for lumbar

Table 1. Demographic and clinical characteristics and results of referral process for patients with low-back pain

Variable	Setting, %*	
	Tertiary, *n* = 61	Secondary, *n* = 58
Age, mean (SD)	50.7 (15.7)	47.0 (12.3)
Male sex	52	41.3
Duration of symptoms†		
Acute (< 6 wk)	1.6	5.2
Subacute (6–12 wk)	9.8	56.8
Chronic (> 12 wk)	88.5	37.9
WSIB	6.3	5.1
Nerve root compression on CT or MRI scan	76	81
Dominant location of pain		
Clearly back-dominant	33	31
Leg-dominant	36	35
Decompression surgery performed or recommended	18	12

CT = computed tomography; MRI = magnetic resonance imaging; SD = standard deviation; WSIB = Workplace Safety and Insurance Board claim.
*Unless otherwise indicated.
†Significant difference ($\chi^2 = 33.1$, $p < 0.001$) between tertiary and secondary care settings.

pain, with a trend toward higher specificity ($p = 0.07$, $\chi^2 = 3.3$). However, under this clearly back-dominant pain scenario, the questionnaire was less specific (35% v. 59%; $p = 0.017$, $\chi^2 = 5.7$) than assessment by pain specialists in the secondary care setting.

For the second scenario (i.e., leg-dominant pain) using the 3-item questionnaire, hypothesized to be "highly specific," the combined sensitivity and specificity from tertiary and secondary referral settings was 83% and 73%, respectively. Using the leg-dominant scenario, the questionnaire was significantly more specific than CT or MRI scans in identifying appropriate surgical candidates for decompression ($p < 0.001$, $\chi^2 = 45.6$), and there was a trend toward lower sensitivity ($p = 0.07$, $\chi^2 = 3.3$). When comparing the questionnaire to assessment by pain specialists in the secondary care setting, it was as sensitive (86% v. 86%) with a trend toward greater specificity (73% v. 59%; $p = 0.14$, $\chi^2 = 2.1$).

Combining the results of the radiographic review and questionnaire resulted in modest improvements in accurately identifying surgical candidates. In the first scenario (i.e., clearly back-dominant pain and no radiological compression), the questionnaire was 100% sensitive and 50.5% specific. This algorithm would reduce the number of consultations by 43% without missing a patient requiring surgery. In the second scenario (i.e., leg-dominant pain with radiological compression), the questionnaire was 83.3% sensitive and 78.2% specific. This algorithm would reduce the number of consultations by 70%; however, it would have missed potential surgical candidates.

Discussion

The identification of specific pain generators in lumbar spinal disorders that may be amenable to surgery is notoriously difficult.[27] However, the presence of leg-dominant symptoms has been identified as an important factor in predicting the success of lumbar decompression surgery.[17–23] Reliance on advanced imaging findings to confirm the presence of neurologic compression to triage for potential surgical referrals is expensive and has an unacceptably high rate of false-positive results. We developed the questionnaire as an easy method of triaging patients presenting with lumbar spine pain to identify those with leg-dominant pain who may be more amenable to spinal decompression surgery and therefore appropriate for advanced imaging and/or who would benefit from referral to a spinal surgeon.

Our study represented a "snapshot" of typical Canadian

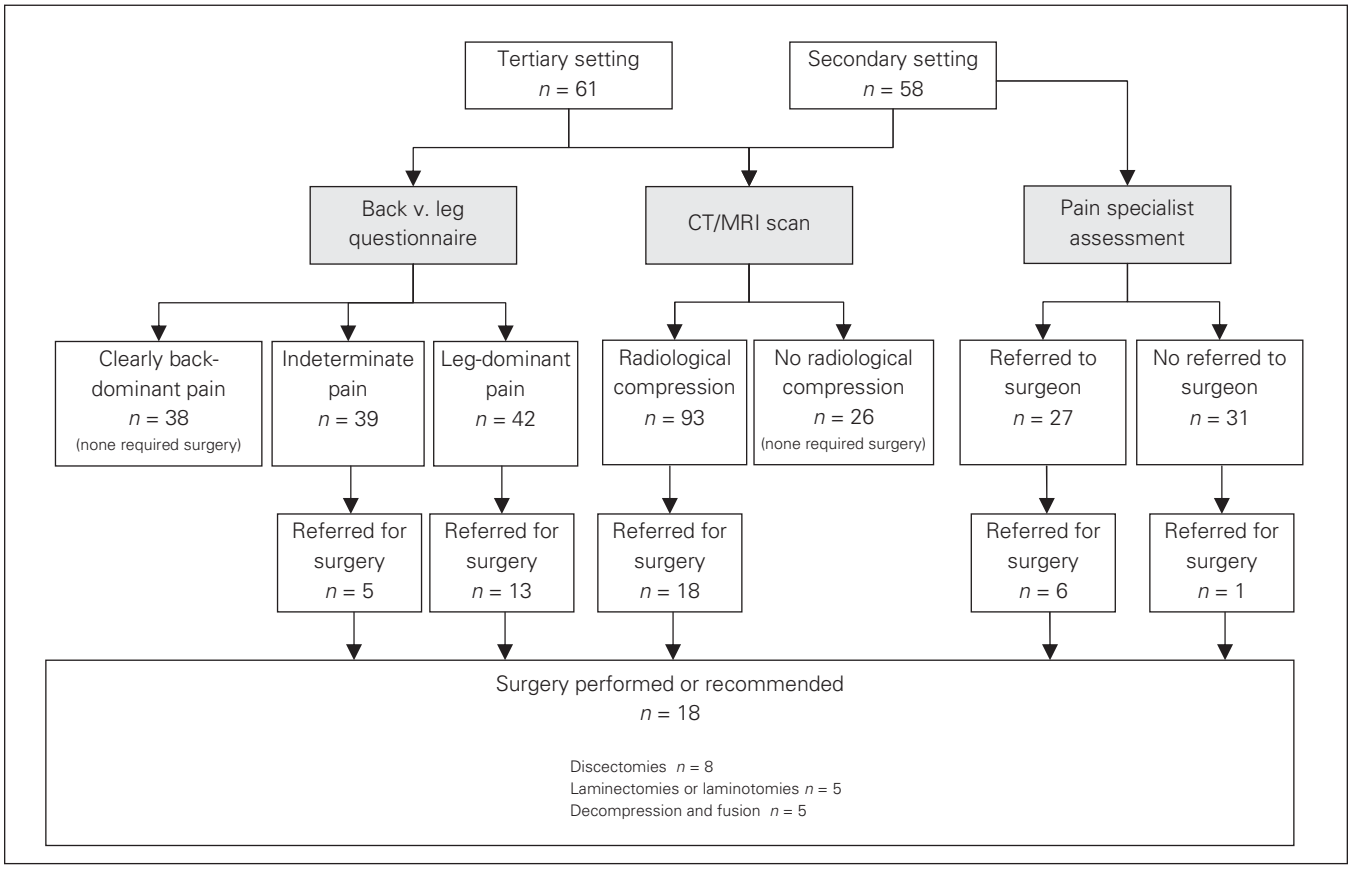

Fig. 1. All patients in tertiary and secondary settings underwent computed tomography (CT) or magnetic resonance imaging (MRI) scans and questionnaire assessments; only patients in secondary settings underwent assessment by a pain specialist. As patients were screened using more than 1 assessment tool, the total numbers listed across the assessment row is greater than 119.

spinal surgeons' practices, and our results can be compared with those from Mofidi and colleagues,[28] who observed that only 14.4% of patients seen in the first year of their acute spinal pain triage clinic required specialist referral and just 4.4% of patients assessed in the triage clinic required surgery. Cassells and colleagues[29] also noted that 15.9% of 1949 patients seen over a 2-year period had identifiable nerve root pain that could potentially benefit from an operative procedure.

There was similar sensitivity and specificity using this questionnaire in both the secondary care and tertiary care settings in our study, suggesting that it may be an appropriate decision aid in multiple clinical settings. Results from our study indicate that this questionnaire was at least as accurate in identifying patients with lumbar spine pain who required spinal surgery as current practice, assessments by pain specialists in a secondary care spinal clinic, and CT or MRI scans.

Using the questionnaire to identify patients with only leg-dominant pain, it would be possible to eliminate two-thirds of inappropriate referrals to spinal surgeons. However, this scenario would fail to identify some patients who may eventually require lumbar spine surgery. Alternatively, using the questionnaire to exclude patients with clearly back-dominant pain may eliminate 30% of inappropriate referrals without failing to identify any surgical candidates.

An ideal situation might be to use the questionnaire, under the highly specific scenario, to identify patients with leg-dominant pain who should be prioritized on the waiting list for earlier consultation with spinal surgeons. Conversely, the highly sensitive scenario could be used to screen out patients who do not need to see the spinal surgeon. This may be beneficial as it has been reported that many patients referred to spinal surgeons do not receive appropriate primary care.[26] This questionnaire may hopefully promote more timely access to appropriate nonoperative care rather than place patients on prolonged waiting lists for surgical consultations before initiating care, which is too often the case.

Other positive downstream effects from using this questionnaire could include improved outcomes for appropriate patients with time-sensitive pathology amenable to surgical

Table 2. Referral results from the tertiary care setting

Screening method	No. of patients identified using this cutoff	No. of patients undergoing surgery	Sensitivity, %	Specificity, %	Positive predictive value, %	Negative predictive value, %
Questionnaire						
More sensitive (i.e., clearly back-dominant pain)						
Yes — Poor candidate for surgery	20	0	100	40	27	100
No — Good candidate for surgery	42	11				
More specific (i.e., leg-dominant pain)						
Yes — Good candidate for surgery	22	9	82	74	41	95
No — Poor candidate for surgery	39	2				
Neurocompressive lesion on CT or MRI scans						
Yes — Good candidate for surgery	48	11	100	26	23	77
No — Poor candidate for surgery	13	0				

CT = computed tomography; MRI = magnetic resonance imaging.

Table 3. Referral results from the secondary care setting

Screening method	No. of patients identified using this cutoff	No. of patients undergoing surgery	Sensitivity, %	Specificity, %	Positive predictive value, %	Negative predictive value, %
Questionnaire						
More sensitive (i.e., clearly back-dominant pain)						
Yes — Poor candidate for surgery	18	0	100	35	18	100
No — Good candidate for surgery	40	7				
More specific (i.e., leg-dominant pain)						
Yes — Good candidate for surgery	20	6	86	73	30	97
No — Poor candidate for surgery	38	1				
Neurocompressive lesion on CT or MRI scans						
Yes — Good candidate for surgery	45	7	100	25	16	100
No — Poor candidate for surgery	13	0				
Referral from pain specialist						
Yes — Good candidate for surgery	27	6	86	59	22	97
No — Poor candidate for surgery	31	1				

CT = computed tomography; MRI = magnetic resonance imaging.

decompression, improved system efficiency and waiting time and potential cost-containment owing to a reduced number of imaging studies unnecessarily ordered to justify referral to a spinal surgeon.

The recent growth in "medical tourism" may have had an effect on the results of our study. Although the study hospital is the only one in the geographic catchment area performing spinal surgery, our methodology may have failed to capture patients who travelled to other sites for their surgeries. Given the large waiting lists across Canada, it is unlikely that patients would have travelled to another Canadian centre. However, it is possible that some patients may have gone to an international centre on their own accord. Nevertheless, it is worth noting that our methodology would have captured the patients to whom surgery was recommended by the study site's surgeon; we found that there were a handful of patients who did not have surgery despite the surgeon's recommendation. Our study did not address medical tourism among patients not seen by a surgeon or undergoing surgery outside of Canada for indications not recommended by a Canadian surgeon and, therefore, medical tourism should be considered in future prospective studies.

Because our study was retrospective and because prospective follow-up could not be accomplished owing to privacy reasons, readers should be cautioned that a small number of patients not captured as having undergone surgery may significantly affect the statistical results. As such, use of this questionnaire to exclude patients is not recommended. However, given the poor quality of information provided in referral letters,[24] it is reasonable to use the questionnaire to help surgeons prioritize their waiting lists for consultations.

Additional studies are required before wide-scale implementation of the questionnaire. Prospective studies with larger populations and more concise follow-up are needed to confirm our results, particularly given the 100% sensitivity that we achieved. The questionnaire could also be combined with other screening methods to further improve the sensitivity and specificity of screening patients presenting with lumbar pain who would benefit from surgical consultations.

Although none of the patients in our study identified as having clearly back-dominant pain using the questionnaire had a surgically correctable spinal instability, such patients do exist and might be misidentified and excluded using the questionnaire. However, conditions such as spondylolisthesis and scoliosis are easily demonstrated on routine radiographs and could be incorporated in the referral and screening process. Future studies could clarify the prevalence of such patients in different settings and potentially identify additional factors that may be used to triage them appropriately.

We did not review the actual radiographic images to identify pathology that could have been addressed by surgery. Arguably, this may improve the accuracy of identifying surgical candidates. However, there are logistical challenges with reviewing the radiographic images for all patients referred to a surgeon, and the use of the radiographic report represents the real-life scenario of most surgeons' practices.

We also did not address functional outcomes or determine success in patients who underwent surgery. However, a recent systematic review[30] demonstrated that back-dominant pain was the only clinical symptom predictive of poor postoperative outcomes in spinal stenosis, which supports the clinical utility of triaging for leg-dominant patients.

The questionnaire would not identify patients with back pain due to degenerative disc disease without instability. However, the indication for surgery for this condition is controversial and associated with poorer outcomes.[31] Although surgery for this condition is common in other countries, a recent survey of Canadian spinal surgeons has demonstrated that it is rarely performed in Canada.[32]

The questionnaire possesses many of the qualities that are desirable in a good screening tool. It is low-cost, easy to use, potentially very sensitive and brief. A good triage mechanism should not compromise the safety and satisfaction of patients without surgical disease,[33] but rather redirect them into appropriate settings under the care of other skilled clinicians and therapists.

Conclusion

Among the myriad of patients with lumbar spine problems, a surgical solution exists for only a minority. Expert opinion and prospective data suggest that the best outcomes for lumbar spine surgery occur in patients with leg-dominant pain. Previous research has identified 3 simple questions that are reliable in identifying leg-dominant pain. Our study has demonstrated that such a questionnaire is potentially 100% sensitive in identifying surgical candidates in multiple settings and that it may be more specific than other methods of triage such as CT or MRI scans and assessments by pain specialists. Triaging patients using this questionnaire may reduce waiting times for consultation and improve surgical outcomes that are negatively impacted by prolonged duration of pain.

Further research is required to confirm our findings, prospectively demonstrate reductions in waiting times and ultimately improve on clinical outcomes. This can be achieved by employing subsequent versions of the questionnaire as a method of triage for elective lumbar spine problems that may be amenable to surgical intervention.

Competing interests: None declared.

Contributors: Drs. O'Neil and Wai designed the study. Drs. Coyle and Wai acquired the data, which Drs. Simon, Dagenais and Wai analyzed. Drs. Simon, Coyle and Wai wrote the article; Drs. Simon, Dagenais, O'Neil and Wai reviewed. All authors approved the article for publication.

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