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The joy of the bread aisle

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I love the simple rhythms of life as a rural doctor. As I go through my routine day, I feel connected to everyone I meet. The ‘Hi Chris’ I offered this morning was to a colleague at the hospital, but it equally could apply to a nurse, a patient or a community member.

None of this is unique to the rural situation, to be sure. Like many things, there is a spectrum of connectivity. Even in the city you will be connected. It is just that the amount, the breadth and depth of connection depends on your character, the ethos of the community, and dilutes with the number of strangers that you interact with.

I did my medical degree at Queens University in Kingston. They claimed they were a small intimate school (and in comparison to Toronto perhaps they still are). However, I considered the university and the city to be the small end of urban because, when I lived in the city of Kingston, there was a community of patients, colleagues, teachers, classmates and friends. Any other social interactions were minimal. You avoided eye contact in public.

I experienced quite a change when I moved to Blind River. At the small end of rural, in the summer, I drove with the windows down because I was always waving hello. If you avoided eye contact in public, you were either pre-occupied or (perhaps) being rude.

When the web of connectivity is this tight, it does get complicated. People start having multiple layers of identity. At first, this was new and I was uncomfortable about the boundaries that I had to drop in social interactions. After being in practice for decades now, I am comfortable about being able to compartmentalise my role as a physician, away from the other roles of friend, client, patient, sailor and so on. It is not that I ignore the other aspects of my relationships; they inform me, when I am being the doctor.

This is the joy of the bread aisle: simple day-to-day life choices where you can take your time and it does not matter, but also where you can meet someone, amongst the rolls and the loaves, and have a layer of conversation that does matter. Living life with continuities of practice and life, interwoven, is a rural joy. You might just be a little late for home.

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Les joies du rayon du pain

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J'adore le rythme simple de la vie à titre de médecin de campagne. À mesure que SE déroule ma journée typique, je me sens connecté à tous ceux que je rencontre. Mon " Bonjour Chris " de ce matin s'adressait à un collègue de l'hôpital, mais il aurait très bien pu s'adresser à une infirmière, à un patient ou à un membre de la communauté.

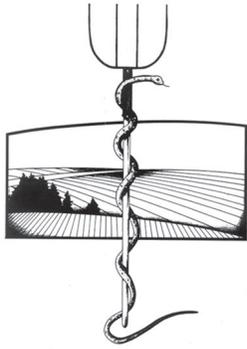
Rien de cela n'est unique au contexte rural, c'est certain. Comme le reste, la connectivité s'inscrit dans un spectre. Même en ville, on est connecté. C'est juste que la quantité, la portée et la profondeur de la connexion dépend de son caractère, des valeurs de la communauté et SE dilue avec le nombre d'étrangers avec lesquels on interagit.

J'ai étudié en médecine à l'Université Queens à Kingston. L'école SE disait petite, intime (et comparativement à Toronto, elle l'est peut-être encore). Mais, je considérais l'université et la ville comme un petit bout de la vie urbaine parce que lorsque je vivais à Kingston, il y avait une communauté de patients, de collègues, d'enseignants, de camarades de classe et d'amis. Toute autre interaction sociale était minime. En public, on évitait de regarder les gens dans les yeux.

Le changement a été renversant lorsque j'ai déménagé à Blind River. À un petit bout de la campagne l'été, je conduisais les fenêtres baissées parce que j'envoyais la main à tout le monde. En public, si on évitait de regarder les gens dans les yeux, c'est parce qu'on était préoccupé ou (peut-être) mal élevé.

Lorsque la connectivité est si étroite, les choses SE compliquent. L'identité des gens SE conjugue en plusieurs facettes. Au début, c'était nouveau et j'étais mal à l'aise avec les limites que je devais faire tomber lors des interactions sociales. Aujourd'hui, après avoir pratiqué pendant des décennies, je suis à l'aise de compartimenter mon rôle de médecin et mes rôles d'ami, de client, de patient, de marin, etc., Ce n'est pas que j'ignore les autres facettes de mes relations; elles m'éclairent lorsque je suis le médecin.

C'est ce que j'appelle les joies du rayon du pain: des choix simples de tous les jours où on peut prendre son temps et ça n'a pas d'importance, mais aussi lorsqu'on rencontre quelqu'un, parmi les baguettes et les petits pains, et qu'une conversation prend de l'importance. Vivre sa vie dans une continuité de pratique et de vie, qui s'entremêlent, est une joie de la campagne. Mais peut-être qu'on sera un peu en retard pour le souper.



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EDITORIAL/ÉDITORIAL

Family physicians as generalists

The Society of Rural Physicians of Canada (SRPC) has a mission of 'championing rural generalist medical care through education, collaboration, advocacy and research'.¹

Rural Canadians live in a variety of settings across the country. Some live near larger centres, others are very isolated and must travel by air to leave their communities. The skill set that the rural generalist needs will vary from community to community. Earlier this year, the College of Family Physicians of Canada (CFPC) published its Family Medicine Professional Profile. This profile reflects the comprehensiveness of family medicine, but also addresses the need for physicians to be adaptive to their communities:

'Family physicians are a resource to their practices and communities as highly skilled generalists, working effectively in diverse environments, addressing complex conditions, and managing uncertainty. They manage a broad range of medical presentations and conditions, flexibly adapting their skills in response to local resources and care needs'.²

Rural residency programs accredited by the CFPC can produce rural generalists who meet the needs of their communities. Many SRPC members are teaching in these programs. Recently, the CFPC

published its 'Priority Topics for the Assessment of Competence in Rural and Remote Family Medicine'.³ Most of the priority topics are related to hospital and emergency care (e.g. trauma, intrapartum care). Some are directly related to living in a rural community (e.g. indigenous health, adapting to a rural life and cultural safety and sensitivity). The CFPC also offers enhanced skills training that is appropriate for rural physicians (e.g. family medicine anesthesia). The SRPC is represented on CFPC working groups that are defining competencies for CACs in Enhanced Surgical Skills and Obstetrical Surgical Skills.

The SRPC and CFPC are co-chairing the Rural Roadmap Implementation Committee (RRMIC).⁴ This committee is working with several medical organizations to support rural generalist care in communities. One of its goals is 'to strengthen a physician workforce with the competencies and skills to provide high-quality and culturally safe care, work in innovative team environments with allied health care providers, and respond to the needs of people who live in rural communities'. In order to meet these goals, the RRMIC is working with educational, health care and community organizations. The Canadian Medical Association has started exploring the interest in a National Locum License. The SRPC feels that such a license

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would be beneficial in promoting a rural generalist skill set.

Training of generalists is progressing steadily, though at times slowly. Moving forward, we may need to focus more on issues of licensing and credentialing. The SRPC will continue to advocate for changes that will support improvements in rural health care.

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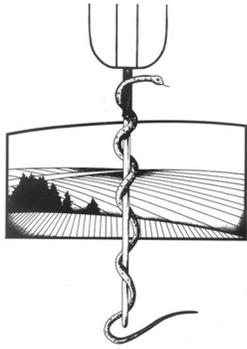
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Médecins de famille à titre de généralistes

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La Société de la médecine rurale du Canada a pour mission de «se faire l'ambassadeur des soins de médecine générale en milieu rural par l'entremise de l'éducation, de la collaboration, du militantisme et de la recherche¹.»

Les Canadiens en milieu rural partout au pays vivent dans une gamme de contextes. Certains vivent près des grandes agglomérations, d'autres sont très isolés et ne peuvent quitter leur communauté que par avion. Les compétences nécessaires au généraliste en milieu rural varient d'une communauté à l'autre. Plus tôt cette année, le Collège des médecins de famille du Canada (CMFC) a publié son Profil professionnel en médecine de famille. Ce profil reflète l'exhaustivité de la médecine familiale, mais aborde aussi le besoin que les médecins s'adaptent à leur communauté:

«En tant que généralistes hautement qualifiés, les médecins de famille sont une ressource pour leur milieu de pratique et leur communauté; ils peuvent gérer des conditions complexes dans divers contextes et gérer l'incertitude. Ils peuvent prendre en charge un vaste éventail de situations cliniques et de troubles de santé, en s'adaptant avec souplesse aux ressources disponibles et aux besoins de leur communauté².»

Les programmes de résidence en milieu rural accrédités par le CMFC forment des généralistes en milieu rural qui répondent aux besoins de leur communauté. Ces programmes sont

enseignés par de nombreux membres de la SRMC. Récemment, le CMFC a publié ses «Sujets prioritaires pour l'évaluation des compétences pour la médecine familiale en régions rurales et éloignées³». La plupart des sujets prioritaires sont liés aux soins d'urgence ou hospitaliers (p. ex. traumatisme, soins de maternité). Certains sont directement liés à la vie en communauté rurale (p. ex. santé des Autochtones, adaptation à la vie en milieu rural et sécurité et sensibilité culturelles). Le CMFC offre aussi une formation en compétences avancées adaptée aux médecins en milieu rural (p. ex. anesthésie en médecine de famille). La SRMC est représentée dans les groupes de travail du CMFC qui définissent les habiletés nécessaires à la certification de compétences acquises en matière de compétences avancées en chirurgie et en chirurgie obstétrique.

La SRMC et le CMFC co-président le comité de mise en œuvre du Plan d'action pour la médecine rurale⁴. Ce comité travaille en collaboration avec plusieurs organisations médicales pour appuyer les soins généraux dans les communautés rurales. L'un de ses objectifs consiste à «renforcer l'effectif médical grâce à des compétences et des habiletés permettant d'offrir des soins de grande qualité, sécuritaire du point de vue culturel, dans des milieux novateurs centrés sur le travail d'équipe en collaboration avec des professionnels de la santé connexes, afin de répondre aux besoins des populations vivant dans des milieux ruraux.» Pour atteindre ces objectifs, le comité de mise en œuvre du Plan d'action pour la médecine rurale

collabore avec des organismes communautaires, d'éducation et de soins de santé. L'Association médicale canadienne (AMC) se penche sur l'intérêt envers une licence nationale de suppléance. La SRMC est d'avis qu'une licence de cette nature serait bénéfique à la promotion des compétences de médecine générale en milieu rural.

La formation des généralistes avance progressivement, quoique parfois lentement. Dorénavant, nous devons peut-être nous concentrer plus activement sur les enjeux d'obtention de licence et de délivrance de titres

et certificats. La SRMC continue de militer en faveur du changement à l'appui de l'amélioration des soins de santé en milieu rural.

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Physician attendance during interhospital patient transfer in Ontario: 2005–2015

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Abstract

Introduction: Interhospital transfer of patients may be attended by a variety of healthcare providers, including physicians. The role of physicians in ambulance transfer in Ontario is not well studied. This study aims to describe the cohort of physicians providing intra-ambulance patient care in Ontario from 2005 to 2015. Secondary outcomes of interest were geographical characteristics of physician-attended transfers and patient characteristics.

Methods: OHIP billing data were used to find all instances of physician-attended air or land ambulance transfer from 2005 to 2015. These data were matched to physician data from the Corporate Providers Database and the Institute for Clinical Evaluative Sciences Physicians Database to describe the physicians providing intra-ambulance care. Patient and geographical data came from the National Ambulatory Care Reporting System and Registered Persons Database to describe the rurality of physician-attended transfers and patient characteristics.

Results: There were 916–1216 physician-attended transfers performed by 508–639 unique physicians in any given year. Physicians were mostly family physicians without anaesthesia or emergency medicine training (58%), with CCFP-EM physicians accounting for 17% and family medicine anaesthetists 10%. Thirty-eight per cent of physicians providing intra-ambulance care practised in rural settings. Seventy-three per cent of physician-attended land transfers originated in suburban, rural or remote hospitals.

Conclusions: Physician-attended ambulance transfer in Ontario is largely provided by family physicians in suburban to remote settings. This may have implications for the education of resident physicians in this unique skill set. Further research is needed into current education practices in intra-ambulance care.

Keywords: Emergency medicine, patient transfer, pre-hospital medicine

Introduction au résumé: Une gamme de fournisseurs de soins, y compris les médecins, sont présents durant les transferts de patients entre hôpitaux. Le rôle du médecin durant les transferts en ambulance en Ontario n'a pas fait l'objet de beaucoup d'études. Cette étude décrit la cohorte de médecins ontariens ayant dispensé des soins en ambulance entre 2005 et 2015. Les paramètres d'évaluation secondaires d'intérêt étaient les caractéristiques géographiques des transferts en présence d'un médecin et les caractéristiques des patients.

Méthodes: Les données de facturation à l'Assurance-santé de l'Ontario ont servi à relever tous les transferts par ambulance aérienne ou terrestre ayant eu lieu entre

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2005 et 2015. Ces données ont été appariées aux données sur les médecins tirées de la Base de données centrale sur les fournisseurs de services de santé et de la base de données sur les médecins de l'*Institute for Clinical Evaluative Sciences* afin de décrire les médecins qui dispensent des soins en ambulance. Les données géographiques et sur les patients visant à décrire le caractère rural des transferts en présence d'un médecin et les caractéristiques des patients provenaient du Système national d'information sur les soins ambulatoires et de la Base de données sur les personnes inscrites.

Résultats: Bon an, mal an, on compte 916–1216 transferts en présence d'un médecin effectués par 508–639 médecins uniques. Les médecins étaient pour la plupart des médecins de famille n'ayant reçu aucune formation en anesthésie ou en médecine d'urgence (58%), la proportion des médecins ayant reçu la désignation CCMF-MU était de 17% et des médecins de famille anesthésistes, de 10%. Trente-huit pour cent des médecins ayant dispensé des soins en ambulance pratiquaient en région rurale. Le point de départ de 73% des transferts en présence d'un médecin était des hôpitaux de la banlieue ou des régions rurales ou éloignées.

Conclusion: Les médecins présents durant les transferts en ambulance en Ontario sont principalement des médecins de famille pratiquant en banlieue ou dans les régions éloignées. Ces résultats pourraient se répercuter sur la formation des résidents en médecine pour acquérir ces compétences uniques. Plus de recherches portant sur les pratiques actuelles d'éducation sur les soins en ambulance sont nécessaires.

Mots-clés: Médecine d'urgence, transfert des patients, médecine préhospitalière

INTRODUCTION

There is a significant variability by jurisdiction in the organisation and staffing of patient transport. Ambulance transfer of patients may be primary transfers, from the site of injury or illness to the first hospital of contact, or secondary transfer, from the hospital of initial contact to another hospital. Primary transfer is generally the domain of the Emergency Medical Services (EMS). Secondary interhospital transfer of patients from the initial hospital to another may be done for diagnostic, therapeutic or logistical reasons. The practice of secondary transfer is generally less well studied, and this includes the role of physicians providing care during secondary transfer.

Currently, in Ontario, urgent interhospital patient transfers are arranged by the sending and receiving hospitals through the local EMS system or through the provincial air ambulance service, ORNGE. ORNGE provides air ambulance services throughout Ontario and ground transport for critical care patients in the Greater Toronto, Peterborough and Ottawa regions. ORNGE vehicles are manned by primary, advanced and critical care paramedics as well as specialised nursing staff for paediatric transfers. Physicians are not used routinely as ambulance crew by ORNGE, but the sending facility may send a physician in an ORNGE vehicle as medical escort, if ORNGE paramedic/nursing

staff are not available.¹ For transfers not arranged through ORNGE, the selection of personnel attending transfer in the EMS vehicle is at the discretion of the sending facility: paramedics, nurses, respiratory therapists or physicians may attend. This decision depends on the needs of the patient, the personnel demands of the sending facility and the resources available, among other factors.²

While 80% of interhospital transfers in Ontario are non-urgent,³ for the purposes of this paper, physician-attended transfers in Ontario were generally assumed to be urgent or emergent; in non-urgent cases, waiting for appropriate paramedic transfer would be preferred to physician-attended transfer. There are no studies in the published literature exploring frequency of physician attendance during ambulance transfer of patients within Ontario. Physician attendance in ambulance transfer is a component of some EMS systems: physicians attend 5% of calls in the STARS Air Ambulance Service in Western Canada,⁴ and physician-staffed air ambulances are routine in some Australian and European jurisdictions.⁵⁻⁷ Rural general practitioners in Norway routinely attend ambulance calls and aid paramedics with on-scene assistance.^{8,9}

In the authors' experience, physician attendance in ambulance transfer in Ontario ranges from routine to exceptionally rare, depending on physician specialty and geography. How often, and

by which physicians, this service is being performed may have implications for resident training in this unique skill set. This study uses retrospective data from the Institute for Clinical Evaluative Sciences (ICES) database to describe the cohort of physicians who provided care to patients during ambulance transfer from 2005 to 2015. Secondary outcomes include geographical characteristics of transfers in which physicians provided care and characteristics of the patients being transported. We hypothesised that most physicians providing this service would be family doctors practising in rural and remote parts of Ontario.

METHODS

The ICES is a not-for-profit research institute that is a recognised entity under the Personal Health Information Protection Act and that houses multiple linked data sets in a secure environment. Data holdings include physician billings, hospital discharges, emergency room attendance, demographic information on patients and physicians, the census, vital statistics, publicly funded home-care services, publicly funded drugs and some large population-based surveys such as the Canadian Community Health Survey. Patient-level data are linked through an anonymised key number.

The Ontario schedule of benefits contains a billing code for physician attendance in ground

ambulance transfer, K101 ‘Ground ambulance transfer with patient per quarter hour or part thereof,’ and another for air transfer, K111 ‘Air ambulance transfer with patient per quarter hour or part thereof’.¹⁰ Using data for a 10-year period from 1st January 2005 to 31st December 2015, OHIP data were obtained for all instances of K101 or K111 billing codes. All units of either K111 or K101 billed by the same physician for the same patient on the same or adjacent days were considered together as a single transfer.

The OHIP data specified the diagnosis, as given by the attending physician at time of billing, and the number of 15 minute units billed. For each transfer, the National Ambulatory Care Reporting System database was searched for an emergency department discharge for the same patient on the same or previous day as the transfer. The rurality index of Ontario (RIO) score for this emergency department was used to describe the rurality of the point of origin. The RIO score is a commonly used measure to describe rurality in healthcare policy considerations. It is a composite measure derived from population (density and absolute) and travel times to basic and advanced referral centres, yielding a score of 0 (most urban) to 100 (most remote) for each census metropolitan area in Ontario.¹¹ Where no emergency department discharge could be identified, the RIO score of the patient’s home municipality was pulled from the Registered Persons Database (RPDB) and

Table 1: Characteristics of physician-attended patient transfers

	Study year										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total number of unique physicians	611	610	639	626	537	512	532	512	529	508	543
Total number of land transfers	1072	1093	1177	1134	983	893	956	924	955	961	1019
Total number of air transfers	34	32	39	45	15	23	17	13	12	17	11
Land transfers by RIO band (per cent of annual total)											
Urban (0-9)	25.0	29.0	27.0	30.7	28.6	31.7	27.2	22.0	24.6	23.1	24.9
Suburban (10-39)	44.9	41.7	43.4	41.9	44.5	44.7	44.6	50.4	48.8	48.4	44.7
Rural (40-64)	24.3	24.4	24.5	22.7	22.5	20.3	23.0	23.5	22.7	24.2	25.3
Remote (65+)	5.8	4.9	5.1	4.8	4.4	3.3	5.3	4.0	3.9	4.3	5.1
Air transfers by RIO band (per cent of annual total)											
Urban (0-9)	15.6	30.0	13.2	20.0	7.1	21.7	18.8	23.1	25.0	17.7	27.3
Suburban (10-39)	15.6	13.3	15.8	24.4	7.1	26.1	25.0	23.1	8.3	17.7	0.0
Rural (40-64)	9.4	10.0	18.4	13.3	21.4	4.4	12.5	23.1	25.0	5.9	18.2
Remote (65+)	59.4	46.7	52.6	42.2	64.3	47.8	43.8	30.8	41.7	58.8	54.6

RIO: Rurality index of Ontario.

used to capture the rurality of the point of origin of the transfer. This was designed to capture transfers from remote communities where the point of origin could be a nursing station rather than a hospital. Some data within the RPDB are verified through data from the Canadian Institute of Health Sciences.

To characterise the physicians, encrypted billing numbers were used to find corresponding data from the Corporate Providers Database (CPDB) and the ICES Physician Database. Physician specialty was gathered from the CPDB and reported as registered with the corresponding regulatory colleges. Family Medicine Anaesthetists were defined for our purposes as any physician registered as a family physician with the Ontario College of Family Physicians who had billed with anaesthesia billing codes, as found in the OHIP database, during that year. The CPDB also contains both a RIO score for physician practice

and a binary variable for a rural practice setting (population under 10,000); these were gathered to describe physician geography.

All datasets were linked using unique encoded identifiers and analysed at the ICES at Queen's University. This study was approved by the Institutional Review Board at Sunnybrook Health Sciences Centre, Toronto, Canada, and the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board, Kingston, Canada.

RESULTS

There were 916–1216 physician-attended transfers performed by 508–639 unique physicians in any given year. This represented between 1.68% and 2.11% of the 30,328 physicians in the OHIP database in 2015. The number of unique physicians in the cohort study is presented in Table 1 along with the population of Ontario physicians in 2015 for comparison. A total number of air and ground transportations per year are also provided in Table 1.

When viewed by specialty, 59%–74% of these physicians were family physicians without EM designation. CCFP-EM-trained physicians are the second largest group at 11%–25%. No other specialty makes up more than 5% of the cohort in any year. The study cohort is presented by specialty in Figure 1.

Physicians practising in remote settings (as defined by a RIO score >65) were overrepresented in this population (4.4%–7.6%) in comparison to the population of Ontario physicians as a whole (1.2%). Rural physicians

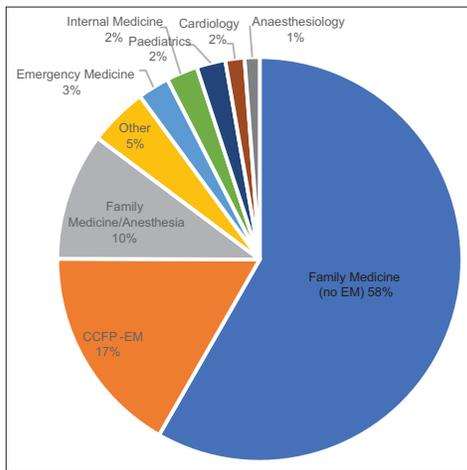


Figure 1: Physicians participating in transfers by specialty.

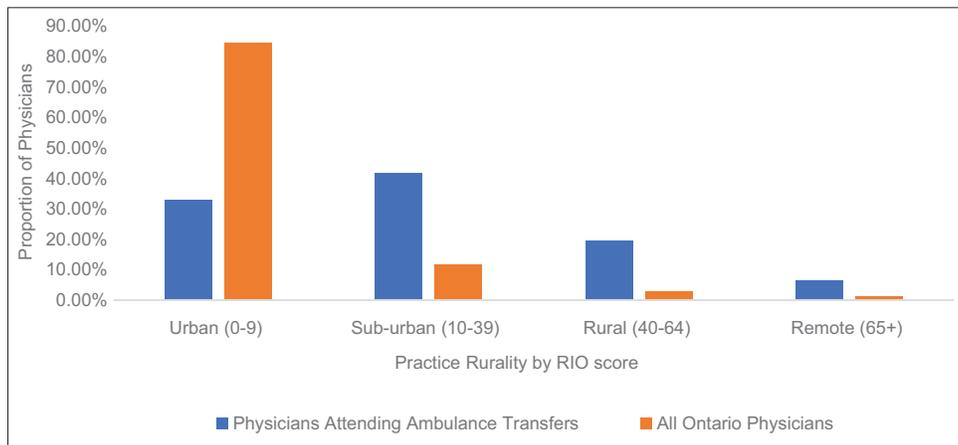


Figure 2: Physician rurality: Physicians attending ambulance transfers versus all Ontario physicians. RIO: Rurality index of Ontario.

(RIO score 40–64) are similarly overrepresented, being 18%–20% of the cohort and 2.8% of Ontario physicians. About 73%–78% of the cohorts were physicians practising in urban or suburban settings, defined as a RIO score of 39 or less. Nearly 35%–40% of physicians providing intra-ambulance care were practising in communities of 10,000 people or fewer, depending on the year. The study cohort is presented by RIO score in Figure 2, along with the population of Ontario physicians in 2015 for comparison.

When viewed by rurality of transfer origin, a similar distribution is seen, with remote transfers making up 4.7% of land transfers and suburban origins comprising a plurality at 45% of land transfers [Figure 3].

When viewed by age, the patients transported with physician attendance were mostly adults aged 18–64, who comprised 52%–54% of patients in any given year. The proportion of paediatric patients fell from 19% in 2005 to 9.5% in 2015, while the proportion of patients 65 years or older rose from 28% to 39% [Figure 4].

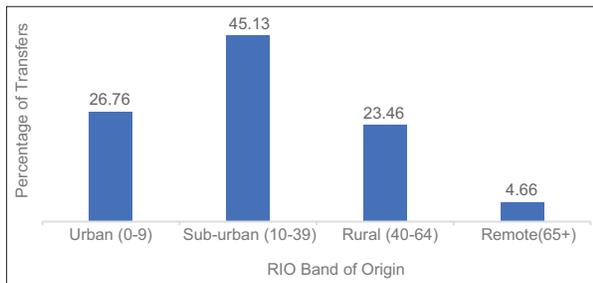


Figure 3: Land transfers by rurality.

Transfers were also analysed geographically and by mode of transport in Table 1. Over 95% of physician-attended transfers were by ground transport, and this proportion rose over the decade studied. Land transfers tended to be relatively suburban and air transfers relatively remote. About 31%–64% of air transfers originated in remote settings versus 3.3%–5.8% for land transfers. Conversely, 42%–50% of physician-attended land transfers began in suburban settings, while these made up 0%–26% of physician-attended air transfers.

DISCUSSION

Clinical practice guidelines give conflicting guidance about attendance of ambulance transfers. The Canadian Association of Emergency Physicians states that caring for critically ill and injured patients in ambulance should be within the skills of physicians providing emergency care in rural settings.¹² Other clinical practice guidelines from the US and UK critical care societies recommend physician attendance for unstable patients, preferably physicians with training in transport medicine and suggest anaesthesia or critical care as areas from which to draw physician expertise.^{13,14} The Canadian Paediatric Society advises that the optimal team for transfer of critically ill neonatal patients consists of specialised nursing and respiratory therapy with neonatologist remote support.¹⁵ While the data regarding optimal transport practices are overwhelmingly

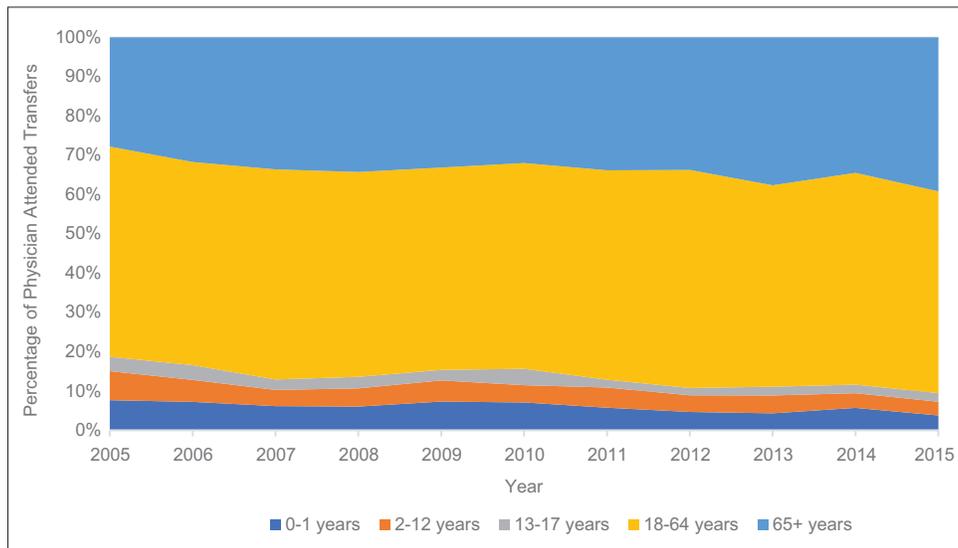


Figure 4: Patients by age category over time.

observational and of moderate quality,¹⁶ the expert consensus is that transport of critically ill patients should be done by specialised teams.¹⁷

We found that by specialty, physician attendance for ambulance transfers was provided primarily by family physicians, most of whom do not have CCFP-EM designation. Rural and remote physicians are over-represented in this cohort, compared to the population of Ontario physicians, highlighting the importance of intra-ambulance care as part of rural and remote medical practice. However, at least 69% of physician-attended transfers began in suburban or urban settings in any given year, and 73%–78% of physicians provide this care practise in urban or suburban settings.

Training of physicians to care for patients during ambulance transfer should be addressed in family medicine training programs. Restricting it to CCFP-EM programs or to rural/remote medicine fellowships would not adequately capture the cohort of physicians who require this skill set. There are no comprehensive surveys of family medicine residency training programs in Ontario or Canada regarding whether they train residents in intra-ambulance care. The family medicine residency program at the authors' home institution (Queen's University) does include simulation training specifically targeted at this skill set. The College of Family Physicians of Canada does not specifically address pre-hospital or intra-ambulance care within their priorities for training of family medicine residents.¹⁸ The Royal College of Physicians of Canada Emergency Medicine training stream does include pre-hospital medicine as a training objective.¹⁹

The proportion of physician-attended transfers done for paediatric patients fell over this time period, from 18.7% to 9.5%. Paediatricians became a smaller proportion of the physicians providing intra-ambulance care as well, falling from 3.4% to 0.7%. This may be due to a concerted effort in Ontario to co-ordinate transfer of critically ill children through the CritiCall system and make greater use of specialised paediatric retrieval teams and ORNGE, which generally use a combination of specialised paramedics, nurses and respiratory therapists, rather than paediatricians.^{15,20,21}

Over the decade studied, the landscape of remote EMS services evolved in Ontario as the Ontario Air Ambulance Services Co. (since renamed ORNGE) was founded in 2005, and capacity was expanded

over the study period. This may reflect the decrease in air transfers attended by physicians but appears to have had no discernible effect on patterns of physician attendance for ground ambulance transfer.

Limitations

We relied on physician billing data to identify when physicians were present for ambulance transfer of patients. As such, cases in which the attending physician did not bill would not be captured. Physicians in salaried positions or under other alternative billing arrangements would be captured if they shadow billed for their services but otherwise would be missing from this data set. It is possible that physician groups that are disproportionately on alternative billing arrangements, such as rural and remote physicians, account for more of this cohort than our data capture. Physician location data may be inaccurate for physicians with more than one practice location or those who are working primarily in locum positions. The clinical indications that determined the requirement for physician attendance during transfer could not be determined from our data set. An analysis of these decisions is a recommended area for future research. Given the variation in EMS systems within and between provinces, these data cannot be extrapolated to other Canadian provinces or territories. For example, the presence of the STARS Air Ambulance Service in Western Canada suggests that practice patterns regarding physician attendance in ambulance transfer are likely substantially different in Western Canadian provinces.⁴

CONCLUSIONS

In Ontario, there were approximately 1000 transfers per year attended by physicians during our study period. The physicians performing these transfers were largely family physicians working in suburban or rural settings. Further research is needed to address the training that family medicine training programs are providing in this area and the clinical and logistical circumstances which give rise to the need for physician-attended transfer.

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Conflicts of interest: There are no conflicts of interest.

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Improving patient preparedness for the operating room: A quality improvement study in Winchester District Memorial Hospital – A rural hospital in Ontario

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Abstract

Introduction: Full completion of the pre-operative checklist is important for proper preparation of patients before they enter the operating room (OR), thus increasing OR efficiency. It is also critical for patient safety and successful outcomes. According to various literature, full completion of pre-operative checklists varies widely between institutions and occurs anywhere between 21% and 92% of cases.^{1,2} Our pre-project audits revealed a suboptimal patient preparedness for the Winchester District Memorial Hospital (WDMH) OR, since only 25% of cases arriving at the OR had their pre-operative checklist completed in its entirety, with no omissions.

Methods: WDMH performed a 12-month long quality improvement (QI) study to improve patient preparedness for the OR. Multiple QI initiatives were used to induce behavioural change by incorporating process mapping, enabling communication, adjusting the pre-operative checklist based on qualitative staff feedback and implementing a staff education plan. Interventions also included two post-implementation audits.

Results: Remarkably, completion of the pre-operative checklist increased from 25% to 67% and finally to 94%. Furthermore, the previous chart's presence and completion of pre-operative orders improved from 87% to 100% and from 82% to 99%, respectively. Another significantly important secondary outcome was improvement in interdepartmental relationships and collaboration. With better communication and checklist completion rates, there came increased patient preparedness and improved efficiency.

Conclusions: Multiple significant improvements and many additional minor improvements strongly suggest that the approaches were used were effective at improving patient preparedness.

Keywords: Checklist, efficiency, Ontario, pre-operative, quality improvement, rural hospital, surgery department

Introduction au résumé: Il importe de remplir complètement la liste de vérification préopératoire afin de bien préparer les patients avant leur entrée dans la salle

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d'opération, ce qui favorise l'efficacité dans la salle d'opération. Cela est aussi essentiel à la sécurité des patients et à l'obtention de résultats positifs chez eux. Selon diverses publications, la réalisation complète de la liste de vérification préopératoire varie considérablement d'un établissement à l'autre, soit de 21 à 92 % des cas^{1,2}. Nos vérifications d'avant-projet ont révélé que les patients du bloc opératoire du *Winchester District Memorial Hospital* (WDMH) étaient préparés de façon sous-optimale, puisque à peine 25 % des listes de vérification préopératoire étaient complètes et sans omissions à l'arrivée des patients à la salle d'opération.

Méthodes: L'hôpital WDMH a réalisé une étude d'amélioration de la qualité (AQ) de 12 mois dans le but d'améliorer la préparation des patients pour la salle d'opération. De nombreuses initiatives d'AQ ont été mises de l'avant pour changer les comportements, soit incorporer la schématisation du processus, favoriser la communication, ajuster la liste de vérification préopératoire en fonction des commentaires qualitatifs du personnel et mettre à exécution un plan d'éducation du personnel. Les interventions comprenaient aussi deux vérifications après exécution.

Résultats: Remarquablement, la réalisation complète de la liste de vérification préopératoire est passée de 25 à 67% et finalement à 94%. En outre, la présence du dossier et l'exécution des ordonnances préopératoires se sont améliorées, pour passer de 87 à 100 % et de 82 à 99 %, respectivement. L'amélioration des relations et de la collaboration entre services était un autre paramètre d'évaluation secondaire significativement important. La meilleure préparation des patients et une meilleure efficacité ont suivi l'amélioration des communications et des taux de réalisation de la liste de vérification.

Conclusions: Les nombreuses améliorations significatives et mineures pointent fortement vers l'efficacité de l'approche utilisée pour améliorer la préparation des patients.

Mots-clés: Liste de vérification, efficacité, Ontario, préopératoire, amélioration de la qualité, hôpital rural, service de chirurgie

INTRODUCTION

Patient preparedness for the operating room (OR) is both complex and multifaceted. Properly preparing patients for the OR in a timely, effective and thorough manner, while adhering to full completion of pre-operative checklists, is a key to ensuring patient safety and comfort, leading to increased efficiency of the department and ensuring success of the procedure. Increased preparedness can be associated with post-operative improvement, increased staff and patient satisfaction and improved quality of life.³ Despite the proven benefits of checklist completion, literature has shown that adherence to and completion of checklist guidelines are often inconsistent and lacking.

A review performed by Gillespie and Marshall in 2015 revealed that within the few studies which measured compliance, reported rates of total completion, post-implementation, ranged from 39% to 92% and went further to argue that within the majority of the reviews, checklists were incompletely or inconsistently executed.¹ These results are consistent with a 2017 study performed by Erestam *et al.*, which showed that upon the introduction of the WHO surgical checklist in a hospital in Sweden, only 21% were fully

completed, with no omissions. The commonly cited causes were poor staff understanding of the importance of every component, breakdown in team communication and lack of employee buy-in.² The Gillespie and Marshall 2015 review also identified the lack of literature successfully addressing the ongoing issue of suboptimal checklist completion and consistency.¹ Furthermore, the review looked at when, why and how implementation of surgical checklists worked and when they did not. It concluded that the checklist strategy was developed and advocated for, to eliminate preventable adverse events in high-risk clinical situations, by creating more dialogue among team members, improving team communications and reducing interruptions and distractions, while increasing identification of errors before surgery.¹

Late in 2015, Winchester District Memorial Hospital's (WDMH's) OR Department participated in the National Surgical Quality Improvement Program-Ontario® (NSQIP-ON), a provincially driven surgical quality improvement (QI) programme initiated through Health Quality Ontario. WDMH was one of only two participating rural hospitals and had limited formal experience in, or infrastructure for, QI. After programme completion and as part of NSQIP-ON participation,

the OR team was asked to identify and improve the quality of one challenging OR care area. The team conducted an audit on the pre-operative checklist which revealed that although the completion of the pre-operative checklist is more than 90%, completing it in its entirety, occurred in only 25% of the cases. The team determined that this deficiency is a safety concern and, as such, presented a potential opportunity for a QI project.

Our primary aim was to increase the pre-operative checklist completion in its entirety to 80% by April 2017 and to provide a detailed description of our results throughout this 12-month QI study. To our knowledge, this study is the first to look at ways of improving pre-operative patient preparedness and the pre-operative checklist in such detail and in a rural setting.

METHODS

Settings

WDMH is a teaching community hospital located 50 km south of Ottawa in a rural area with few small villages. It serves a largely rural, geographical area of 1500 km with a population of approximately 37,000. Its services include emergency, childbirth centre and diagnostic imaging, including digital mammography and computerised tomography scans. It offers inpatient medical and surgical services, as well as day surgery services, complex continuing care and outpatient clinics. WDMH is also a hub site for cancer care, dialysis and cataract surgery and offers specialty clinics with visiting specialists from Ottawa hospitals.

The WDMH operating department has three operating theatres with pre-operative (surgical day care) and post-operative (post-anaesthesia care unit) beds. The unit runs 5 days a week from 0800 to 1500, with on-call staff for emergency cases after hours, including statutory holidays and weekends. However, staffing varies each day based on the surgeries to be performed. In 2016–2017, there were 4235 surgical day care cases and 532 inpatient surgical cases at WDMH. The unit provides surgical services for endoscopy/colonoscopy screening, therapeutic, gynaecology, general surgery, obstetrical (C-sections), ENT (including but not limited to, tonsillectomy, thyroidectomy and sinus surgery), ophthalmology (eyes), plastic surgery (e.g., breast reconstruction following mastectomy) and urology.

Ethics exemption

This QI study received an administrative review, and ethics exemption was granted by the WDMH Ethics Committee.

Interventions

Information gathering

One of the initial processes completed by the research and OR teams was to map the entire patient flow from the time the staff at various departments were aware that the patient was going to the OR until the time the patient was OR ready. The methodology used was based on the lean value stream mapping processes, a method for mapping a series of events of a service from its beginning through to the customer. The group was required to break down the process for each department to identify the unique gaps.

The second intervention performed by the group was a qualitative evaluation to get feedback from 60 members of the front-line staff on how 'patient preparedness' was defined to them in their professional opinion. The questionnaire targeted OR, medicine/surgery and emergency room nurses and was administered by the OR nurse team lead (TL). The questionnaire was administered in a non-formal face-to-face interview that sought to gather input from staff. The questionnaire also served as a form of staff education, since the process of interviewing staff and paraphrasing questions made individuals more aware of their contribution to the patient preparedness dilemma.

Instituting a quality improvement plan

Enabling communication

Once the unique challenges of each department were identified, results of process mapping were communicated to the TLs of each department. Each TL oversaw sharing the findings and the identified communication gaps with their respective team. Subsequently, multiple interdepartmental team meetings and brainstorming sessions took place. This enhanced the collaboration between departments, as the teams began to think and work as a cohesive group in their search for solutions. The teams tailored a streamlined process between

departments that focused on communication between TLs and the OR float nurse, an extra-scheduled nurse who floats between recovery room and OR to allow other nurses to take their breaks and help when needed. As soon as the OR float nurse was notified of a case coming to the OR from another unit, the OR float nurse would call the sending unit TL with an approximate surgery time and surgery reason, which was sometimes not previously known by staff in the sending unit. The sending unit TL would then indicate whether the patient would be ready for the designated time and be given the opportunity to present other concerns such as unclear surgeon pre-operative orders or specific circumstances unique to the case. Any delay or change to case order was also communicated back and forth to prevent any knowledge gaps.

Using feedback

The feedback gathered from the previous steps was used to make the pre-operative checklist more efficient and precise. It is important to highlight that the checklist went through multiple phases of change which included many elements such as, but not limited to, the addition of malignant hyperthermia, isolation precautions, the inclusion of more extensive information related to vital signs, Nil per os (NPO) and bowel preparation.

Educating staff

Initially, the physician lead of NSQIP, who was also the chief of surgery, along with the OR nurse TL offered the interested front-line staff to attend a 2-day provincial QI training. The resulting team was comprised of one surgeon, one administrative

lead, one infection control personnel and four nurses. After the training, this team helped create the QI project and educate other members of the hospital on the issue.

Education was delivered by the hospital educator, charge nurses and unit TLs, to nursing staff who worked in departments that send patients to the OR (e.g., emergency, medicine/surgery, complex care and labour and delivery). It is prudent to note that although information pertaining to the revised OR checklist was important for staff who regularly send patients to the OR, it was equally important for units that less frequently use this form as they are often unaccustomed to the process of patient preparation for the OR. Education was delivered through both individual and small group sessions throughout the hospital on both days and evenings to reach the largest number of staff working during the various shifts. Face-to-face teaching is often preferred by staff as it provides the opportunity for clarification or further explanation of the subject, in addition to identifying any issues with the nurses' understanding of its proper use.

Measuring the effect of the quality improvement plan

Data were retrospectively collected for eight indicators and from patient charts. Patient charts were reviewed using the designed audit checklist.

To determine the impact of the interventions, three audits (pre-post-post) were conducted using a checklist [Appendix A] in time periods before and after the interventions. Evaluative techniques were performed by the authors themselves.

Table 1: Trends in the measures of patient preparedness in response to quality improvement interventions

Outcome	Baseline audit April 2016 (n=289), n (%)	Phase II audit October 2016 (n=142), n (%)	P	Phase III audit April 2017 (n=123), n (%)	P
Patients were physically prepared upon arrival	280 (97)	138 (97)	1.00	121 (98)	0.69
The pre-operative checklist was complete*	72 (25)	95 (67)	<0.0001	116 (94)	<0.0001
The old chart was present (if applicable)	251 (87)	141 (99)	<0.0001	123 (100)	1.00
IV was running and patent	275 (95)	139 (98)	0.17	122 (99)	0.63
Height, weight and BMI were on the chart	260 (90)	136 (96)	0.038	121 (98)	0.29
Pre-operative orders were complete	237 (82)	135 (95)	<0.0001	122 (99)	0.07
The OR was appropriately notified re:Latex Allergy and precautions	263 (91)	141 (99)	0.0004	122 (99)	1.00
Anticoagulant therapy was documented	280 (97)	142 (100)	0.034	118 (96)	0.02

*The team agreed that for the checklist to be marked complete, it had to be 100% filled, OR: Operating room, BMI: Body mass index, IV: Intravenous

Table 2: Lean value stream mapping outcomes

1. The team quickly realised that each referring department had their own unique set of concerns regarding communication when sending patients to the OR
2. We could see that patient preparedness was poorly understood when the departments were asked to assist in breaking down the process in order to identify the gaps
3. Due to communication gaps, the medicine/surgery staff did not know what was expected of them by the OR nurses
4. The OR nurses did not realise that the staff on the referring unit often were unaware of the expected surgery time, making scheduling planning and preparation difficult
5. In multiple situations, staff may not even have been made aware that the patient was going to the OR

OR: Operating room

Table 3: Questionnaire focuses

1. Responsibility for the patient's preparedness
2. Opinions about the pre-operative checklist
3. Questions within the pre-operative checklist
4. The handover process between departments
5. Ways to improve patient preparedness practices
6. The outcomes that should be measured by the audit

Table 4: Questionnaire outcomes

1. Lack of defined roles and responsibilities
2. Communication gaps between the various teams involved in OR patient preparedness
3. Many staff were unaware of the poor performance of pre-operative preparedness
4. Multiple deficiencies and omissions in the design of the pre-operative checklist that is used to prepare a patient for the OR

OR: Operating room

During Phase I, baseline data were collected by a pre-operative auditing checklist, which included factors such as physical preparation, completion of the checklist, allergies and anticoagulant therapy documentation. After implementation of the interventions, a second and third audit (Phase II and Phase III) took place at 6-month intervals following the baseline, which extracted the same data from patient charts. The second and third audits enabled the assessment of the impact of the pre-operative preparedness teaching moments (signs and one-on-one) since a more streamlined and accurate patient preparedness process would indicate an improvement in staff understanding and implementation. Quantitative investigations were used to report the data sets using common statistics such as percentages and graphs to describe the raw data, identify

patterns and visualise the data. The significance of differences between audits, second audit versus baseline and third audit versus second audit was tested using Chi-square tests or Fisher's exact tests, as appropriate.

Ethical considerations

To protect the participants, the data pulled for this study were irrevocably de-identified to alleviate any privacy risk. The researchers performing the study did not report any ethical concerns regarding their roles in the study.

RESULTS

To measure the effect of the QI plan, data were retrospectively collected for 8 indicators and from 554 patient charts. At baseline, 289 eligible patient charts were reviewed using the designed audit checklist, resulting in the information in Table 1. Table 2 identifies the gaps in the checklist process. Feedback from 60 members of the front-line staff on how 'patient preparedness' was defined is documented in Tables 3 and 4. The checklist, which went through multiple phases of change, is shown in Appendix B.

Over the course of the project, there were two post-audits (Phases II and III) that took place to re-measure the indicators on the audit checklist. The two post-audits were conducted at 6-month intervals following the baseline. In Phase II, 142 patient charts were examined. The Phase II audit showed a significant jump in the pre-operative checklist completion from 25% to 67%. All other indicators either stayed at the same high percentage or increased.

In the Phase III audit, 123 patient charts were examined, showing another upsurge in the 'pre-operative checklist completion' from 67% to 94%. Indicators either maintained a high percentage or improved, except the 'anticoagulant therapy was documented' indicator which decreased 1% from Phase II and 4% from baseline data. Full results are presented in Table 1.

The original deficiency of the checklist was not only due to a poorly designed form but also a result of dissonant relationships between the various departments. Qualitative evaluation at the beginning of the study uncovered the fact that the departments were often unaware of each other's duties and responsibilities. We also learned

that staff are eager to be involved in QI studies. As an example, the education sessions were well received by the nurses, and they appreciated being consulted to provide input to the QI initiative.

DISCUSSION

The results from our 12-month QI study on improving pre-operative patient preparedness exceeded our expectations. Using many behavioural-changing approaches resulted in OR patients becoming consistently and increasingly better prepared for their surgeries. The audit results for 7 out of 8 indicators improved, with the most important being the pre-operative checklist with 100% completion increasing from 25% to 94%. Unexpectedly, the original deficiency was not only due to a poorly designed form but also a result of dissonant relationships between the various departments. Consequently, the QI study not only improved pre-operative checklist completions but also helped bring the various departments together to establish lasting links of respect and understanding in regard to workflow, expectations and workload between them. The non-tangible benefits of this project were invaluable: relationships between the departments have been enhanced and there is a marked increase in collaboration among them (e.g., an OR nurse would no longer hesitate to assist another department in preparing a patient when the department is in over-capacity mode). Our results also showed that staff were keen to take part in QI studies. For example, the nurses liked the education sessions and appreciated being consulted.

To our knowledge, this study is the first to solely look at ways of improving pre-operative patient preparedness checklists in such detail in a rural area. Therefore, we could not compare the results to other publications. Nevertheless, our results build upon those displayed in the literature. Panni *et al.* in 2013 investigated the effects of a pre-operative checklist and team training programmes and found that these additions (along with a pre-operative facilitator) substantially improved their OR efficiency.⁴ Overdyk *et al.* also performed QI measures for their own circumstances to improve their OR efficiency, including educational periods (e.g., meetings, memos and poster boards), and found that the OR efficiency improved.⁵ Being one

of the first of its kind, this study proves that a quality control study and quality improvement programmes can indeed be done in a small rural hospital.

Barriers to performing a QI evaluation in a rural hospital might include getting staff to participate in an education plan, to provide qualitative feedback and general financial constraints. In addition, a perception on the part of staff regarding a lack of time to fill out checklists might be encountered. Therefore, educating staff that this may be the most time-effective way of passing vital patient information onward increases the chances of the QI initiative's success.

Limitations

This study has several limitations, the most obvious of which being those of size and scope, as the study was only performed in one isolated hospital, which affects the potential generalisability of the implementations. However, the simplicity of the design demonstrates that it should be easily implemented or at least provides some guidance, to any other medium- or small-sized hospital.

CONCLUSIONS

This study found that a comprehensive and multi-pronged approach to improve patient pre-operative preparedness resulted in marked improvement in satisfactorily meeting quality improvement criteria over a 1-year period. Barriers to proper preparedness and improvement thereof were evaluated and solutions suggested. This study aims to help guide other hospitals seeking to tackle the issue of incomplete pre-operative checklists.

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APPENDICES

Appendix A: Pre-operative auditing checklist			
Date: _____	Admitting department: _____		
MRN: _____	_____		
Procedure: _____	_____		
	Yes	No	N/A
1. Is pt. physically prepared: on a stretcher*, gown on, fully undressed, jewellery removed or taped			
2. Correct surgical package pulled for chart i.e., SDA, endoscopy			
3. Pre-operating room checklist completed 100% with no blank boxes and signed by nurse			
4. Old chart if applicable			
5. Current chart (complete chart, MAR, nurses' notes, consult notes)**			
6. IV patent and running			
7. Weight, height, BMI measured and current on chart			
8. Consent in chart, filled and signed by patient (signed only if pt. has spoken to surgeon and informed consent obtained)			
9. Pre-operative orders completed, ordered blood work results available as per orders (Pre-printed orders, clinical pathway, PAC orders or MD orders)			
10. Was OR notified of latex allergy, MH precautions, isolation precautions before pt transfer to OR			
11. Has pregnancy test been done on all females under 50 and documented (N/A for Endoscopy and cataracts)			
13. Is last dose of anticoagulant or NOAC (Novel Oral Anticoagulation) noted			
15. During Surgical Safety Checklist when pt in the room, while confirming pt identity and procedure with team, ask pt. if they feel prepared and ready for surgery			
*If patient not on stretcher, has this been discussed and alternate arrangements made?. ****Complete chart Definition for different areas, *Emerg: ER documentation and nurse notes, ¹ Med/Surg: Entire chart including MAR, bedside chart, ² OB: Entire chart including MAR, beside chart, ³ DSU: Entire chart including consult note			

If 'NO' for any of the above please provide details			
	Yes	No	N/A

At time of pause: Is this patient well prepared?

Comments: _____

Appendix B: Final version of the pre-operative room checklist

Pre-operating room checklist

Date (yyyy/mm/dd): _____	Ride Name : _____	
Procedure: _____	Relationship: _____	
_____	Contact No.: _____	
Family doctor: _____		

Surgeon: _____		

Relevant medical conditions		

Latex allergy Yes No	Preoperative checklist: (initial)	Last clear fluids (date/time): _____
Malignant hyperthermia Yes No	NPO	Last solid food (date/time): _____
Isolation precautions Yes No	Implants (joint, mental, lens, etc.)	Yes No N/A
Types of precautions: (*notify OR)	Dentures Out	_____
Vital signs:	Contact Lens	_____
MAP _____	Piercings Removed	_____
Time: _____	Jewellery Off	_____
BP _____	Last Void	_____
TPR _____ SAO ₂ _____	Bowel Prep Completed	_____
(Actual) Ht: _____ cm Wt: _____ kg	Bowel Prep Results	_____ Time _____
BMI _____	Consent signed	Good (clear) Poor (stool present)
Hair clipping: Yes (Please fill info below)	Pre-operative Questionnaire	_____
No	Complete	_____
Time: _____	Name of Anticoagulants	_____ N/A _____
Site _____ Initial	Date Anti-coagulant discontinued	_____ N/A _____
_____	(yyyy/mm/dd)	Yes No N/A
Intravenous:	Test Results: Blood Group and Screen	_____
IV Access _____	INR	_____
Site _____	Blood Work	_____
IV Solution _____ #	ECG	_____
of Attempts _____	POCT	_____
Patient	Urine Pregnancy (β hCG)	Results: Initials: Date/Time:
Response _____	Glucose by glucose meter	Pos Neg _____
Initial _____	(by order/medical directive)	_____ mmol/L _____
	Consults	(Reference Interval 4.0-11.0 mmol/L)
	OR RN receiving patient	Yes No
	Signature	_____
	Initials	_____

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Getting a Grip on Arthritis Online: Responses of rural/remote primary care providers to a web-based continuing medical education programme

Abstract

Introduction: Physicians are often challenged with accessing relevant up-to-date arthritis information to enable the delivery of optimal care. An online continuing medical education programme to disseminate arthritis clinical practice guidelines (CPGs) was developed to address this issue.

Methods: Online learning modules were developed for osteoarthritis (OA) and rheumatoid arthritis (RA) using published CPGs adapted for primary care (best practices), input from subject matter experts and a needs assessment. The programme was piloted in two rural/remote areas of Canada. Knowledge of best practice guidelines was measured before, immediately after completion of the modules and at 3-month follow-up by assigning one point for each appropriate best practice applied to a hypothetical case scenario. Points were then summed into a total best practice score.

Results: Participants represented various professions in primary care, including family physicians, physiotherapists, occupational therapists and nurses ($n = 89$) and demonstrated significant improvements in total best practice scores immediately following completion of the modules (OA pre = 2.8/10, post = 3.8/10, $P < 0.01$; RA pre = 3.9/12, post = 4.6/12, $P < 0.01$). The response rate at 3 months was too small for analysis.

Conclusions: With knowledge gained from the online modules, participants were able to apply a greater number of best practices to OA and RA hypothetical case scenarios. The online programme has demonstrated that it can provide some of the information rural/remote primary care providers need to deliver optimal care; however, further research is needed to determine whether these results translate into changes in practice.

Keywords: Clinical practice guideline, needs assessment, online system, osteoarthritis, professional education, rheumatoid arthritis

Introduction: Il est souvent difficile pour les médecins d'accéder à de l'information pertinente et à jour sur l'arthrite dans le but de dispenser des soins optimaux. Un

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programme en ligne de formation médicale continue visant à disséminer les lignes directrices de pratique clinique sur l'arthrite a été créé pour résoudre ce problème.

Méthodes: Des modules d'apprentissage en ligne sur l'arthrose et la polyarthrite rhumatoïde (PR) ont été élaborés à l'aide des lignes directrices de pratique clinique publiées ayant été adaptées pour les soins de première ligne (pratiques exemplaires), des commentaires des spécialistes en la matière et d'une évaluation des besoins. Le programme a été mis à l'essai dans deux régions rurales et éloignées du Canada. La connaissance des lignes directrices de pratique exemplaire a été mesurée avant, immédiatement après avoir terminé les modules et au suivi de trois mois en accordant un point à chaque pratique exemplaire appropriée appliquée à un scénario de cas hypothétique. La somme des points indiquait le score de pratique exemplaire.

Résultats: Les participants représentaient diverses professions de première ligne, dont médecins de famille, physiothérapeutes, ergothérapeutes et infirmières ($n = 89$) et ont affiché une amélioration significative des scores totaux de pratique exemplaire immédiatement après avoir terminé les modules (arthrose avant = 2,8/10, après = 3,8/10, $P < 0,01$; PR avant = 3,9/12, après = 4,6/12, $P < 0,01$). Le taux de réponse à trois mois était trop faible pour l'analyse.

Conclusions: Grâce aux connaissances acquises dans les modules en ligne, les participants ont pu appliquer un plus grand nombre de pratiques exemplaires aux scénarios de cas hypothétiques d'arthrose et de PR. Le programme en ligne a montré pouvoir fournir une part de l'information que les fournisseurs de soins en région rurale et éloignée ont besoin pour dispenser des soins optimaux, cependant des recherches plus poussées sont nécessaires pour déterminer si ces résultats se traduisent par des changements de la pratique.

Mots-clés: Polyarthrite rhumatoïde, arthrose, lignes directrices de pratique clinique, système en ligne, évaluation des besoins

INTRODUCTION

Arthritis and related conditions affect more than 6 million Canadians aged 15 years and older.¹ Life with Arthritis in Canada estimates that the direct and indirect costs to the individual, the health care system and to society are \$6.4 billion per year.² Most treatment for people with arthritis occurs at the primary care level. In 2005–2006, arthritis accounted for close to 9 million physician visits.² In many jurisdictions, primary care physicians often report difficulty in diagnosing the many forms of arthritis, have limited access to specialists and may not be aware of the benefits and availability of nonpharmacological interventions.^{3,4} They have been shown to lack confidence in their ability to assess and manage musculoskeletal (MSK) conditions and to be only moderately satisfied with their ability to deliver arthritis care.⁵

Getting a Grip on Arthritis (GRIP) was designed to address this gap. GRIP is a national, accredited, face-to-face (F2F), interprofessional, educational programme based on the clinical practice guidelines (CPGs) for osteoarthritis (OA) and rheumatoid arthritis (RA) and has been shown to increase health care providers' ability to manage arthritis⁶⁻⁷ and improve patient outcomes (exercise behaviour, appropriate medication use).⁶ GRIP was

delivered through a workshop, 9 hours in length, which covered the differentiation of OA from RA and the pharmacological and nonpharmacological management of the two conditions. The average GRIP F2F workshop trained 30 providers (physicians, nurses and rehabilitation therapists) and cost approximately \$20,000.00. The high cost, regardless of the demonstrated benefits, made it necessary to explore options that allowed the programme to be delivered more broadly and in a sustainable format.

Online learning has been shown to effectively deliver continuing medical education (CME) to improve provider knowledge, skills, satisfaction and clinical practice behaviours.⁸ An online version of the GRIP programme would allow many more health care providers to be reached at a lower cost, particularly those working in rural or remote locations. Thirty per cent of Canadians live in rural, remote, northern and aboriginal communities⁹, where the prevalence of arthritis is high compared to urban areas.² Health care providers are scarce in these communities and their access to CME opportunities may be limited⁹. Online learning is a preferred format for CME because it supports a self-directed approach, is cost-effective and is easily accessed, especially where professional constraints may prevent time

away from work.¹⁰⁻¹² Online learning has been shown to satisfy learners' needs¹³ and effectively deliver CME to improve provider confidence and practice,^{8,14,15} especially when compared to no intervention.

In keeping with this, the goals of this project were to (1) identify the needs of primary care providers who treat arthritis in rural and remote regions of Canada, (2) develop an accredited online version of the GRIP programme (GRIP Online) focusing on the evidence-based management of RA and OA in rural settings and (3) pilot test the programme in two remote regions of Canada. Specifically, we were interested in whether the GRIP Online programme would improve primary care providers' recommendations/adherence to arthritis best practices and increase confidence and satisfaction with their ability to manage arthritis.

METHODS

Needs assessment

A needs assessment was conducted to identify priority content for two online educational modules on RA and OA. A design team consisting of researchers, multidisciplinary primary care providers, educators and adults with arthritis developed online surveys (French and English), one for primary care providers and one for the public. Questions were based on the GRIP best practice guidelines for OA and RA⁶ which were developed in 2000 from CPGs and then updated by the Cochrane MSK Disease Group in 2012. Members of six national groups (Society of Rural Physicians of Canada, Canadian Kinesiology Alliance, Canadian Association of Community Health Centres, Arthritis Health Professions Association, First Nations and Inuit Home and Community Care Programme, Arthritis Society) were invited by their organisations to complete the online surveys. The survey URL was sent by e-mail and/or posted on their websites and distributed through their newsletters and through eblasts. Several evidence-based strategies were used to increase survey response rates: providing prenotification, two reminder e-mails, a deadline for survey completion and an incentive (opportunity to win a \$50 Chapter's gift card).¹⁶

The provider survey asked participants to rate arthritis best practices in terms of their priority for online learning. Ratings of educational priorities (1 = lowest priority and 10 = highest priority) were compared by urban/rural status. Providers were also asked to rate their confidence with various aspects of arthritis care and satisfaction with their ability to manage arthritis on a numerical rating scale (1 = not satisfied/confident/and 10 = extremely satisfied/confident).

Potential unperceived provider needs were captured through a modified version of the survey distributed to patients through the communications channels of three patient organisations: Patient Partners® in Arthritis, the Consumer Advisory Council of the Canadian Arthritis Network, and the Arthritis Society.

Online programme development and evaluation

The GRIP Online programme was developed based on the results of the needs assessment, published guidelines for OA¹⁷⁻²⁰ and RA²¹⁻²⁷ and input from multidisciplinary subject matter experts on OA and RA from across Canada, including two members of the Society of Rural Physicians of Canada. The programme was piloted over a 6-week period in two rural/remote areas of Canada with documented high arthritis prevalence and shortages of health care professionals (Northwestern Ontario Local Health Integration Network and the Newfoundland and Labrador Central Regional Health Authority). Recruitment was targeted and done through the six national partner groups identified above.

Several methods were used to evaluate the programme. All participants completed a survey on their satisfaction with the programme design and content immediately after completing the programme and 3 months later. Participants also completed a modified version of the Arthritis Community Research and Evaluation Unit Primary Care Survey²⁸ which measures confidence and satisfaction with the ability to manage arthritis (rated on a numerical rating scale of 1-10; 1 = not at all confident/satisfied and 10 = extremely confident/satisfied) and participant's application of best practices to two hypothetical case scenarios: moderate

knee OA and an early presentation of RA. Best practices included recommendations on: exercise/physical activity; patient education; weight management; occupational therapy (OT)/joint protection/energy conservation; use of assistive devices; psychosocial support; pain medication; anti-inflammatory medication and joint injections for both OA and RA. Surgical consult was added for OA and rheumatology referral, corticosteroids, and disease-modifying anti-rheumatic drugs (DMARDs) were added for RA. Best practices were evaluated by (1) assigning one point for each correct best practice applied to the case scenario and summing the points into a total best practice score for each participant (total possible scores for OA and RA were 10 and 12, respectively) and (2) the percentage of participants who applied each best practice to the case scenarios.

Analyses

Survey responses were exported to SPSS (IBM Canada Ltd. SPSS Statistics, V. 24 Markham Ontario, Canada) and analysed using descriptive statistics (means, median and proportions). Results were analysed before (pre) and immediately following completion of the programme (post) using nonparametric statistics where appropriate. Those participants indicating that the best practice was 'not in scope' were removed from the analysis. Unfortunately, the sample size for the 3-month follow-up survey was low (OA: 11 and RA: 14) precluding meaningful comparisons with baseline. $P < 0.05$ was considered the level of statistical significance. Changes were determined to be clinically significant if the immediate post-programme scores were $\geq 15\%$ compared to baseline. A 15% improvement is greater than the 10% median improvement reported by Grimshaw *et al.* in a large-scale review of guideline implementation strategies²⁹ and is less than the percentage expected for the improvement in clinical trials evaluating arthritis medications.³⁰

This project received ethics approval from the Health Research Ethics Authority (HREA #13.067), Newfoundland and Labrador and McMaster University. Participants' written informed consents were received to publish the results of both the needs assessment and the evaluation of the online programme.

RESULTS

Needs assessment

Responses to the needs assessment survey were received from 333 providers (rural/remote = 38.9%) and reflected the multidisciplinary arthritis care team: physicians (50.2%), physiotherapists (13.2%), nurses/nurse practitioners (10.5%), occupational therapists (7.5%) and 'others' (18.6%). Providers were mostly female (73.3%), worked full time (71.6%) and were moderately confident with their ability to manage most aspects of arthritis care; however, confidence in using/recommending DMARDs for RA was low (median: 4/10; $n = 192$). Confidence was generally similar for providers working in urban and rural settings; however, rural providers were more confident in using/recommending corticosteroids and joint injections (Mann–Whitney U-test, $P < 0.01$).

The best practices that were rated the highest priority for online learning were OT/joint protection/energy conservation, self-management education and pain/anti-inflammatory medications as well as DMARDs and referral to rheumatology for RA (median rating $\geq 7/10$). Ratings were similar across urban/rural status; however, guidelines for referral to rheumatology for RA were a lower educational priority for rural respondents (Mann–Whitney U-test, $P < 0.05$). Physicians rated surgical referral and joint injections as topics with higher priorities than other disciplines ($P < 0.05$).

Table 1: Learning objectives for Getting a Grip on Arthritis Online programme

RA and OA
Identify the signs/symptoms of early arthritis
Distinguish between RA and OA
Describe when to initiate and/or how to monitor analgesic and anti-inflammatory medications
Identify when to perform or refer for an intra-articular injection
Recognise the need for nonpharmacological interventions
Describe when and how to initiate referrals to allied health professionals and community resources
Identify appropriate patient/provider resources
RA only
Describe when and how to initiate a rheumatology consultation for suspected RA
Describe when to initiate and/or how to monitor DMARDs

OA: Osteoarthritis, RA: Rheumatoid arthritis, DMARDs: Disease-modifying anti-rheumatic drugs

The patient survey resulted in 93 responses (rural/remote=31.1%). Most respondents were female (89.3%) in the 18–64-year-old age group (83.1%) and most had either RA (45.4%) or OA (26.3%). Respondents rated all best practices as important (median $\geq 7.9/10$), and there were no significant differences in the median rating based on urban/rural status, diagnosis (RA versus OA) or age (≤ 64 vs. $65 +$ years) (Mann–Whitney U-test, $P > 0.05$).

Programme development and pilot study

The online programme was then developed and hosted by Memorial University through MDcme.ca and was offered at no cost by the Arthritis Society. The two modules used ‘real-life’ cases and incorporated branching scenarios that presented questions, allowed participants to choose actions and then see a patient response. They incorporated self-assessment techniques and a combination of text, audio, videos, graphics and links to public and provider online learning tools and resources. References and links to the current CPGs for RA and OA were embedded in the modules. An ‘Ask the Expert’ feature and a discussion board were

put in place and facilitated by physician subject matter experts. The learning objectives for the programme are outlined in Table 1.

During the pilot, 89 rural primary care providers, representing a mix of disciplines, including physiotherapists (44%), nurses (31%), family physicians (12%), occupational therapists (7%) and others (6%), registered for the online programme over the 6-week period (Northwestern Ontario: $n = 61$; Central Region of Newfoundland and Labrador: $n = 28$). Of the total, 35 participants completed both pre- and post-assessments of the OA module and 31 completed the assessments of the early RA module. A majority of respondents agreed that the modules were consistent with stated objectives (OA = 97.5% and RA = 97.1%), addressed their learning needs (OA = 87.2%; RA = 94.3%), were relevant to practice (OA = 80.0% and RA = 91.4%) and were credible and nonbiased (OA = 100%; RA = 97.1%). Participant feedback also highlighted the need for additional information relevant to professions other than physicians to better capture the importance of multidisciplinary care. This feedback was incorporated into the final accredited version of the programme.

Table 2: Pre- and post-results for the Getting a Grip on Arthritis Online pilot programme: Osteoarthritis and early rheumatoid arthritis satisfaction and confidence^a

OA module	Pre-median (IQR)	Post-median (IQR)	Percentage change from baseline	<i>n</i> ^b
Satisfaction	7.00 (6.00:8.00)	8.00 (7.00:9.00)**	14.3	35
Confidence in recommending/prescribing or performing				
MSK examination	8.50 (5.75:10.00)	9.00 (6.75:10.00)**	5.9	34
IA knee injection	1.00 (1.00:5.00)	4.00 (1.00:7.00)	300.0	11
NSAIDs	6.00 (1.50:8.00)	7.00 (3.50:8.50)	16.7	13
Oral corticosteroids	2.00 (1.00:5.00)	4.00 (2.00:6.50)**	100.0	13
Serological tests	5.00 (1.00:7.00)	5.00 (3.00:8.00)*	0.0	13
Managing MSK conditions	9.00 (7.00:9.75)	9.00 (7.00:10.00)**	0.0	32
RA module	Pre-median (IQR)	Post-median (IQR)	Percentage change from baseline	<i>n</i> ^b
Satisfaction	6.00 (3.00:7.00)	7.00 (6.00:8.00)*	16.7	31
Confidence in recommending/prescribing or performing				
MSK examination	9.00 (6.00:9.00)	9.00 (7.00:9.00)	0.0	31
IA knee injection	1.00 (1.00:5.00)	2.00 (1.00:5.00)**	100.0	11
DMARDs	1.00 (1.00:2.00)	3.00 (1.25:0.3.75)**	200.0	12
NSAIDs	5.50 (1.75:8.00)	6.50 (2.75:8.00)	18.1	14
Oral corticosteroids	3.00 (1.00:7.00)	4.00 (2.00:7.25)**	33.3	14
Serological tests	5.00 (2.00:8.00)	7.00 (2.00:8.00)	40.0	15
Managing MSK conditions	8.50 (4.75:9.00)	9.00 (6.00:10.00)	5.9	30

^a $P < 0.01$, ^{**} $P < 0.05$, Wilcoxon signed-rank test. ¹1=Not at all confident/satisfied; 10=Extremely confident/satisfied, ^bThose participants indicating that the best practice was ‘not in scope’ were removed from the analysis. IQR: Interquartile range, MSK: Musculoskeletal, IA: Intra-articular, NSAIDs: Nonsteroidal anti-inflammatory drugs, DMARD: Disease-modifying anti-rheumatic drug, OA: Osteoarthritis, RA: Rheumatoid arthritis

Tables 2-4 present the results of the evaluations of the participants of the GRIP online pilot project. Participant satisfaction with the ability to manage arthritis improved significantly immediately following both the OA and early RA modules (Wilcoxon signed-rank test; $P < 0.05$) [Table 2]. The improvement for RA was also clinically important (16.7%). Participants also reported significant and clinically important improvements in confidence for recommending or prescribing corticosteroids (OA: 100.0% and RA: 33.3%). Immediately following the OA module, participants also reported significant

improvements in confidence for completing the MSK examination, ordering serologic tests and managing common MSK conditions ($P < 0.05$). Improvements in recommending a knee injection and nonsteroidal anti-inflammatory drugs (NSAIDs) were clinically important (300.0% and 16.7%, respectively). Following the early RA module, improvements in confidence in recommending/prescribing knee intra-articular injections and DMARDs were both statistically significant and clinically important (100.0% and 200.0%, respectively) although final confidence levels were still relatively low.

Table 3: Pre- and post-results for the Getting a Grip on Arthritis Online pilot programme: Osteoarthritis best practices^a

OA module	Mean (SD)		Percentage change from baseline
Total best practices score ^b	2.8 (1.4)	3.8 (1.9)*	35.7
Participants who applied each recommended best practice: <i>n</i> (%)			
Education	14 (41.2)	19 (55.9)	14.7
Exercise/PT	31 (91.2)	34 (100.0)	8.8
OT/joint protection/energy conservation	11 (32.4)	20 (58.8)**	81.5
Assistive devices	5 (14.7)	10 (29.4)	100.0
Weight management	5 (14.7)	9 (26.5)	80.3
SW/social support	0 (0.0)	2 (5.9)	0.0
Analgesics	7 (20.6)	14 (41.2)	100.0
NSAIDs	8 (23.5)	12 (35.3)	50.2
IA injections	5 (14.7)	5 (14.7)	0.0
Surgery referral/consult	8 (23.5)	5 (14.7)	-37.4

* $P < 0.01$, ** $P < 0.05$. ^aThose participants indicating that the best practice was 'not in scope' were removed from the analysis, ^bTotal possible best practice score=10. IA: Intra-articular, SW: Social worker/social work, PT: Physiotherapy/physiotherapist, OT: Occupational therapy/occupational therapist, NSAIDs: Nonsteroidal anti-inflammatory drugs, SD: Standard deviation

Table 4: Pre-and post-results for the Getting a Grip on Arthritis Online pilot programme: Rheumatoid arthritis best practices^a

Early RA module	Mean (SD)		Percentage change from baseline
Total best practices score ^b	3.9 (2.1)	4.6 (1.7)*	17.9
Participants who applied each recommended best practice: <i>n</i> (%)			
Education	15 (46.9)	22 (68.8)**	46.7
Exercise/PT	25 (78.1)	29 (90.6)	16.0
OT/joint protection/energy conservation	22 (68.8)	27 (84.4)	23.0
Assistive devices	9 (28.1)	8 (25.0)	-11.0
Weight management/healthy eating	3 (9.4)	4 (12.5)	33.0
SW/Social Support	5 (15.6)	8 (25.0)	60.3
Analgesics	7 (21.9)	7 (21.9)	0.0
NSAIDs	11 (34.4)	8 (25.0)	-27.3
IA injections	1 (3.1)	1 (3.1)	0.0
DMARDs	2 (6.3)	6 (18.8)	198.4
Oral corticosteroids	4 (12.5)	4 (12.5)	0.0
Rheumatologist referral	21 (65.6)	24 (75.0)	14.3

* $P < 0.01$, ** $P < 0.05$. ^aThose participants indicating that the best practice was 'not in scope' were removed from the analysis, ^bTotal possible best practices=12. IA: Intra-articular, SW: Social worker/social work, PT: Physiotherapy/physiotherapist, OT: Occupational therapy/occupational therapist, DMARDs: Disease-modifying anti-rheumatic drugs, RA: Rheumatoid arthritis, SD: Standard deviation

Table 3 compares the baseline and immediate post-programme total best practice scores and specific best practice recommendations for the participants who completed an evaluation of the OA module. The programme resulted in a 35.7% improvement in total best practice scores for OA (paired samples *t*-test; $P < 0.01$) and more participants selected OT/joint protection/energy conservation as a best practice following the programme, an improvement of 81.5% (McNemar's test; $P < 0.05$). There were also clinically important improvements for several other best practices, namely, assistive devices (100.0%), weight management (80.3%), analgesics (100.0%) and NSAIDs (50.2%). There was also a clinically significant reduction in the number of people who recommended surgical consults (-37.4%).

Table 4 compares the baseline and immediate post-programme total best practice scores and specific best practice recommendations for the participants who completed the evaluation of the early RA module. Total best practice scores for the RA module improved by 17.9% immediately following completion of the module (paired samples *t*-test; $P < 0.01$) and more providers selected education as a best practice for the client in the RA case scenario, an improvement of 46.7% (McNemar's test; $P < 0.05$). Clinical improvements were seen for several other best practices, namely, exercise (16.0%), OT (23.0%), weight management (33.0%), social support (60.3%) and DMARDs (198.4%). There was also a clinically significant reduction in the percentage of respondents recommending NSAIDs for this scenario (-27.3%).

DISCUSSION

The GRIP Online programme, developed with the input of rural health care providers and people with arthritis, was successfully implemented over the 6-week pilot phase in two remote/rural locations in Canada. The programme addressed priorities for online education identified in our needs assessment and met programme goals by improving provider satisfaction and confidence in their ability to assess and manage several components of arthritis care. A multidisciplinary mix of rural participants, including physicians, indicated that the programme addressed their

learning needs and was relevant to practice.

Despite our small sample, improvements were seen in some aspects of arthritis care, namely, satisfaction with the ability to manage arthritis and total best practice scores. This suggests a potential to improve the overall management of arthritis. For OA, participants' confidence in performing a comprehensive MSK examination and in managing common MSK conditions improved significantly. This was coupled with a reduction in the number of referrals for surgical consults. This is promising since most OA can be managed conservatively at the primary care level, potentially resulting in fewer referrals to specialists and savings for the health care system. For RA, participants' confidence in prescribing/recommending DMARDs improved significantly. If DMARDs are initiated early, this might result in improvements in outcomes for people with RA.⁵¹⁻⁵³ However, despite improvements following the programme, confidence remained low for prescribing DMARDs for RA and also for performing intra-articular injections. These results might suggest priorities for future F2F CME.

There was an improvement in total best practice scores for OA and RA following the programme, suggesting successful dissemination of arthritis CPGs. For OA, more providers selected OT/joint protection/energy conservation and for RA, more providers selected education as a best practice which could result in improved patient self-management and outcomes. Despite these improvements, this pilot study did not assess practice change and it is unclear whether changes in knowledge will translate to improved care and patient outcomes. GroL and Grimshaw suggest that behaviour change likely requires a more comprehensive approach which involves changes to the system and environment in which people work.⁵⁴ Qualitative studies have also shown that physicians value opportunities for the discussion and interactions that occur with F2F CME.^{55,56} Developers of online programmes need to consider ways to incorporate opportunities for facilitated online discussions or synchronous interactions among participants. Previous work by the authors (VC and LF) has shown that facilitators have a key role in creating a positive online learning environment, facilitating introductions among participants and sharing related experiences.^{13,14,37}

The study was limited because of the small sample size. However, these numbers were considered adequate for a pilot study (>30/group). There was no control group or randomisation; therefore, the results are subject to several biases in terms of subject selection and the risk of cointervention that might influence outcomes. Evaluating the effectiveness of the intervention requires the Canada-wide implementation of the programme using a randomised controlled trial. A larger sample would allow subgroup analysis and generalisation to physicians and other provider groups working in rural settings across Canada. Long-term follow-up is needed to determine if practice change has occurred and resulted in improved patient outcomes.

CONCLUSIONS

This project resulted in the development of two accredited online modules on OA and RA, based on the learning priorities of rural providers, and was successfully pilot tested in two underserved regions of Canada. Results showed that the programme was relevant to a mix of disciplines working in primary care settings and suggest that this online programme might successfully disseminate arthritis CPGs and improve the nonpharmacological and medical management of arthritis in practice. GRIP Online was accredited (Mainpro-M1) and launched nationally in February of 2014 (<http://www.mdcme.ca/grip>). Since the launch of the programme, over 1250 primary care providers have registered for the OA programme and over 900 have registered for the RA programme, suggesting that this may be a viable and accessible option for improving the management of arthritis, particularly for providers working in rural and remote communities.

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Laparoscopic cholecystectomy for ultrasound normal gallbladders: Should we forego hepatobiliary iminodiacetic acid scans?

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Abstract

Introduction: Hepatobiliary iminodiacetic acid (HIDA)-radionuclear scans are used to diagnose biliary dyskinesia, the treatment for which is a laparoscopic cholecystectomy (LC). However, the predictive value of the HIDA scan for LC candidacy is debated.

Case: A physical, ultrasound, and blood test for a 53-year-old woman with biliary dyskinesia-like symptoms were normal, contradicting a textbook history. A HIDA-scan was ordered but the results suggested she was not eligible for a LC. The patient insisted on receiving the procedure and gave informed consent to undergo an elective LC.

Results: Six-weeks post-surgery, the patient's symptoms had ceased besides one short episode of abdominal pain.

Conclusion: A LC relieved the patient's symptoms, suggesting that negative HIDA-scans can mislead correct decisions to perform a LC. Surgeons who receive inconclusive HIDA scan results should consult their patients, and when necessary and agreed-upon, take an informed risk together in an attempt to improve the patient's quality of life.

Keywords: Biliary dyskinesia, HIDA scan, acalculous cholecystitis, chronic cholecystitis without stones, gallbladder dysfunction, symptomatic ultrasound normal gallbladders

Introduction: La scintigraphie hépatobiliaire avec acide iminodiacétique (HIDA) radionucléaire sert au diagnostic de dyskinésie biliaire, qui est traitée par cholécystectomie par laparoscopie. La valeur prédictive de l'HIDA pour identifier les candidats à la cholécystectomie par laparoscopie fait cependant l'objet d'un débat.

Cas: L'examen physique, l'échographie et les analyses sanguines d'une femme de 53 ans qui présentait des symptômes évoquant la dyskinésie étaient normaux, ce qui contredisait l'anamnèse modèle. Une scintigraphie HIDA a été réalisée, mais les résultats ont laissé croire que la patiente était inadmissible à la cholécystectomie par laparoscopie. La patiente a insisté pour subir l'intervention et a donné son consentement éclairé pour subir une cholécystectomie par laparoscopie non urgente.

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Résultats: Six semaines après l'intervention, les symptômes de la patiente étaient disparus, à l'exception d'un épisode de douleur abdominale.

Conclusion: La cholécystectomie par laparoscopie a soulagé les symptômes de la patiente, ce qui laisse croire que la scintigraphie HIDA négative peut entraîner des erreurs de décision pour réaliser une cholécystectomie par laparoscopie. Les chirurgiens qui reçoivent des résultats inconcluants à la scintigraphie HIDA doivent consulter leurs patients, et lorsque nécessaire et entendu, prendre ensemble un risque éclairé pour tenter d'améliorer la qualité de vie des patients.

Mots-clés: Dyskinésie biliaire, scintigraphie HIDA, cholécystite alithiasique, cholécystite chronique sans lithiases, dysfonctionnement biliaire, vésicules biliaires symptomatiques échographie normale

INTRODUCTION

Biliary pain in the absence of objective laboratory or radiologic findings such as ultrasound is referred to as biliary dyskinesia.¹ The incidence of this symptom complex (estimated as 8% in men and 21% in women²) is almost as unclear³ as the test used to detect it: the hepatobiliary iminodiacetic acid (HIDA)-radionuclear scan. The predictive value of HIDA scans is debated. When faced with a patient with a typical history and a normal ultrasound, we wonder whether we are doing justice to a patient living in a remote part of our country by ordering a test which may not change the ultimate decision: to operate or not.^{4,5} This case underscores the unreliability of the HIDA scan for indicating laparoscopic cholecystectomy (LC) candidacy.

CASE REPORT

A 53-year-old woman presented to a rural surgical clinic in Western Newfoundland complaining of severe, intermittent epigastric pain radiating to the back and occurring periodically about once weekly for several years. The discomfort was provoked by consuming foods such as bacon or eggs and was associated with epigastric burning, bloating, and belching which would last for 1–2 h. She described feeling completely well between the attacks. Three years prior, the patient had been seen for an upper gastrointestinal (GI) endoscopy and stomach biopsy for *Helicobacter pylori*. These tests were normal. Her symptoms had been temporarily improved with proton-pump inhibitors. She was a non-smoker, non-drinker with a history of two normal deliveries and a bladder repair. She had chronic low back pain. Her physical examination was normal. Even the Murphy's sign, which

would make the gallbladder a prime suspect, was negative. Routine bloodwork such as complete blood count, electrolytes, liver functions, including bilirubin and amylase, ultrasound, and the HIDA scan were all normal. A repeat upper GI endoscopy with an attempt to aspirate bile from the duodenum did not reveal any bile crystals. Likewise, a colonoscopy was normal. A barium meal revealed mild reflux. The small bowel motility was normal.

After explaining to the patient that there was no objective evidence of a symptomatic gallbladder, despite a textbook history suggesting the opposite, she insisted that something needed to be done to relieve her symptoms. "If I had a knife, I would take it out myself. My uncle and my mother both had their gallbladders out. One of their ultrasounds was normal as well". Given the congruency of the clinical history and the relatively low risk of any complication being less than 2%,⁶ the patient was given a choice to undergo a LC. She provided informed consent to undergo the operation, which occurred without complications. The intra-abdominal organs looked fine and the gallbladder was normal, even on the subsequent pathology report.

During a 6-week follow-up appointment, the patient reported that her pain and burping had ceased, though interestingly, she was more constipated, an unusual symptom after cholecystectomy. She had experienced one short episode of abdominal pain, mostly gas trapping. Otherwise, her symptoms were relieved.

DISCUSSION

Over the years, the lead author (JR) has often encountered this scenario and discussed it with prominent surgeons and gastroenterologists. Most (usually the older ones) agree that it

is reasonable to operate after exhausting all possible investigations and informing the patient. However, many were still reluctant to do so based on history only; despite agreeing that something needs to be done, we wondered if we ordered enough preoperative investigations to take that educated leap. This paper presents one such case where every attempt was made to determine the most appropriate course of action, but ultimately, the test results were not conducive to a LC, despite the patient's symptoms and history being textbook for this surgery.

A typical history involves intermittent severe right upper quadrant pain radiating to the right shoulder after fatty meals; a Murphy's sign on physical examination makes the gallbladder the prime suspect. On the other hand, an atypical history might include reflux, or 'dyspepsia', associated with nightly epigastric burning and pain of a milder nature alleviated by antacids, H2-blockers. Basic bloodwork ensues, and some practitioners may prescribe H2-blockers. If symptoms do not improve despite avoiding non-steroidal anti-inflammatory drugs, and alcohol, and especially, if factors like unintentional weight loss or anaemia are present, an upper GI endoscopy ensues. This could show inflammation of the upper GI tract down to the duodenum, erosions, ulcers, and even a hiatus hernia or (rarely) tumors.

Confronted with an atypical scenario, we consider GI causes, for example, irritable bowel, celiac disease and intestinal bacterial growth, musculoskeletal problems—radicular pain T6–T10, scoliosis and spondylosis and vascular – intestinal claudication and unstable angina.

If we suspect the gallbladder to be malfunctioning (typical history), despite a normal ultrasound, we may order a HIDA scan. If the HIDA scan results are normal, then the opinions of surgeons are divided. Some colleagues prefer to proceed only if they find an objective abnormality. Inquisitive diagnosis, while important, is second to caring for the patients, communities, and societies to which we are accountable as healthcare providers.⁷ Listening to our patients is the key to quality care. Faced with inconclusive HIDA scan results, the surgeon can leave the diagnosis in no man's land and the patient's needs unaddressed or empathise with their needs and take an informed risk together in an attempt

Table 1: Unpublished quality improvement findings

Patient's sentiments at follow-up	HIDA scan result		
	Abnormal	Normal	Not performed
Definitely improved	4	3	1
Somewhat improved	1	1	1
Not improved	1	0	0

Counts of patients' ($n=12$) responses from a follow-up phone call by an impartial third person after the patients underwent a LC. Patients were asked whether they thought their symptoms had improved post-operatively.

to improve the patient's quality of life. Is it not better to try something than do nothing? To offer any avenue for relief than turning our backs on the patient? Is this not in the spirit of socially accountable medicine?

The literature about the usefulness of the HIDA scan is controversial.^{5,8,9} Yet, in 2015, the largest retrospective study of 438 patients showed⁸ that in case of typical symptoms, the HIDA scan is inferior as a method of predicting post-operative pain relief (66% with positive scan and 77% with negative = normal scan).

In 2007, 4% (48 patients) of 1201 patients¹⁰ with biliary colic had normal ultrasounds and endoscopy results. Thirty-five of these patients received positive HIDA scans and went on to have LCs. Thirty-one reported symptom alleviation or improvement at the 6-week post-operative mark. Of the remaining 13 patients who had inconclusive HIDA scans, 6 went on to have a LC with full symptom relief. Although the HIDA scan proved to be accurate for the 31 patients who improved, performing a LC with an inconclusive HIDA scan was still effective for an additional 6 patients. One of the normal HIDA scan patients later presented with acute cholecystitis.

The Rome IV consensus conference¹¹ about functional gallbladder disorder emphasises the typical biliary history as the strongest predictor for post-operative success. While recommending a HIDA scan should be done, the conference recognises that many studies of the cholecystokinin radionuclear scans ejection fraction are inconclusive and of poor quality.

Of course in acute cholecystitis, the HIDA scan is superior to abdominal ultrasound.¹²

Experts are divided on the HIDA scan's use for diagnosing biliary dyskinesia.⁷ The lead author's own unpublished results from a practice-based quality improvement (QI) study [Table 1] show that only one of 12 patients reported no

post-operative improvement when contacted by an impartial third person about their sentiments regarding the operation. That is, the HIDA scan does not appear to predict surgical success and might as well be a coin flip that has no place in today's era of fiscal responsibility. Investigations that ultimately do not impact our decision to operate are an inefficient, frivolous use of healthcare funds that, particularly for rural patients, is an impetus for unnecessary long-distance travel. Why gamble when you can listen to the patient?

Although post-cholecystectomy syndrome (PCS)¹³ is a recognized symptom complex varying in frequency between 6-47% of patients after LC for symptomatic gallstones, none of the studies of LC for biliary dyskinesia reported any adverse events. The worst outcome was a nonresolution of symptoms.

Since JR's original, unpublished QI study, she has treated 60 more patients with a LC for biliary dyskinesia. Future research will follow up with patients to check the typical history (length, type and severity of symptoms) pre- and post-surgery to determine if a LC, performed despite a normal HIDA scan, results in symptom relief.

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The occasional nasal foreign body

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INTRODUCTION

Patients with intranasal foreign bodies (FBs) are typically young children aged 2–5 years. Less commonly patients may be older children, adolescents, or adults with intellectual disabilities.^[1] FBs can be classified as inorganic (beads, marbles, stones, nails, crayons, and small toys) or organic (beans, carrots, seeds, candy, and gum), with the latter usually producing earlier symptoms due to increased irritation of the nasal mucosa.^[2–4]

Patients with intranasal FBs generally present in two manners: (1) the caregiver witnesses the insertion of an FB, or the child tells the caregiver of the deed or (2) an FB is suspected after unilateral nasal obstruction, or purulent discharge is noted.^[1,4,5]

Most cases of the intranasal FBs do not require otolaryngology consultation and can be handled by the experienced primary care physician with proper equipment. FBs that are in the posterior nasal cavity, poorly visualized, chronic, impacted with associated severe mucosal inflammation, or those where removal attempts have failed, warrant further referral. Of note, there are two FBs that may cause severe damage and necessitate urgent attention and skilled removal: button

batteries and disc magnets.^[6,7] The search for dangerous metallic FBs may be hastened by obtaining X-rays.

ANATOMY

Intranasal FBs are most commonly found along the floor of the nasal passage under the inferior turbinate or anterior to the middle turbinate.^[4] Finding FBs on the right side is more common, possibly due to increased prevalence of right-handedness,^[2,5,8] but it is important to search both nasal canals, as well as both ear canals, for other FBs.

EQUIPMENT

The basics as follows [Figure 1]:

1. For visualizing: headlight or lamp, otoscope, and nasal speculum
2. For grabbing the FB: right-angle hook, forceps: Alligator, Lucae, Gruenwald, micro polypus, mosquito or Hartmann forceps
3. Suction: metal suction catheter or other device.

More advanced as follows:

4. Irrigating device and normal saline
5. Catheter: Fogarty, Foley, or Katz, size 5–8 French
6. Swab to which cyanoacrylate glue can be applied
7. Drugs: oxymetazoline, 0.05% (Dristan, Otrivin), lidocaine, 1% or 2%, and phenylephrine, 0.5%

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8. Cotton pad or gauze
9. Sheet for wrapping immobilization
10. Magnet: pocket magnet pickup or cardiac pacemaker magnets ×2
11. Oxygen tubing and male–male tube adaptor.

Procedure

Gaining the trust and cooperation of the patient and caregiver are imperative. If unable to do this, the patient may need to be restrained or sedated. Visualization of the FB can often be achieved by simply using a headlight or otoscope. If available, a flexible endoscope can be used to find elusive FBs that are thin, transparent, or superiorly located. If an FB cannot be visualized, in a cooperative patient, irrigating the nasal cavity with saline and suctioning the fluid and debris may enhance visualization.

Positive pressure technique

Ask the patient to close the opposite nostril with a finger and then blow through their nose^[4] [Figure 2]. Parents of children too young to do this may blow air into their child's mouth while occluding the unaffected nostril.^[9] Alternatively, positive pressure can be achieved by closing the patient's mouth and inserting a male–male tube adapter hooked up to 10–15 L/min of oxygen into the unaffected nostril^[10] [Figure 3].

The positive pressure technique is best for smooth FBs that are easily visualized and occlude all or a large portion of the nasal canal. Small,

nonocclusive objects in the anterior nose and objects that remain after attempting positive pressure should be removed with instruments.

Removal with instruments

There are a variety of instruments that may be used for FB removal; however, there are certain steps that are essential for success, regardless of the chosen instrument.

Preparation

Except in the case of button batteries, the following is helpful. Five minutes before removal is attempted, a topical anesthetic and vasoconstrictor should be applied to the affected nostril,^[5,11,12] as decreasing the swelling around the FB increases the chances of successful removal. This can be achieved by instilling a few drops of 1-2% lidocaine and either 0.5% phenylephrine or 0.05% oxymetazoline.^[12] It may be beneficial to apply the solution mixture through a soaked cotton pad gently inserted into the affected nostril.^[5]

Positioning

The need for restraint and procedural sedation should be assessed. Cooperative patients may tolerate the procedure while sitting. For young children and noncooperative patients, a sheet wrap should be used to hold the patient in a supine position on the bed while an assistant holds the patient's head.^[13] If the patient continues to

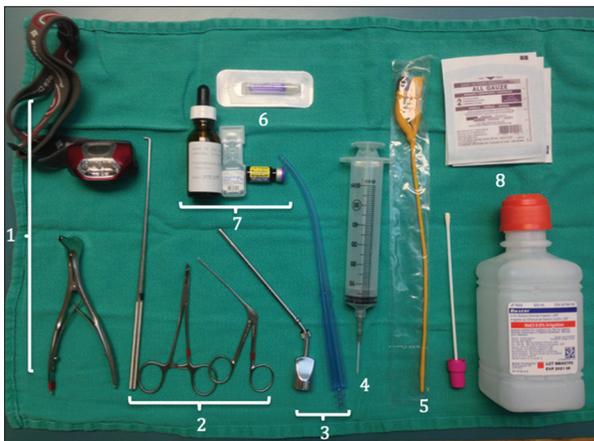


Figure 1: Materials that may be required for removal of nasal foreign body, numbered as listed above. Not pictured: otoscope, blanket, pocket magnet pickup, oxygen tubing, male–male tube adapter, cotton pad, cardiac pacemaker magnets.



Figure 2: The patient should close the opposite nostril and blow through their nose.

be uncooperative, procedural sedation may be required.

The nasal canal should be illuminated and examined using either an otoscope or a nasal speculum with a headlight or lamp. The thumb of the nondominant hand may be used to pull the tip of the nose upward while the dominant hand manipulates the instrument^[5] [Figure 4].

Instrumentation

The choice of instrumentation should be based on the characteristics of the FB.

Nonocclusive, compressible objects, or ones with rough surfaces may be easily grasped and removed using forceps (alligator, Lucae, or Gruenwald).^[12] However, forceps should never be used for round objects, as this risks pushing them further into the nasal canal.

Smooth, round objects that cannot be grasped easily (e.g., beads, pebbles, and marbles) require more care. Removal may be attempted using a blunt right-angle hook to pull the object out of the nasal canal. If this is unsuccessful, a balloon catheter (Foley or Fogarty, size 5–8 French) lubricated with lidocaine jelly can be inserted past the object, inflated with 2–3 mL of air, and then withdrawn.^[14,15] Alternatively, removal with a metal suction catheter up to 180 mmHg can also be attempted.^[16]

For cooperative patients where the FB is easily visible, but all other options have failed, removal with cyanoacrylate glue may be attempted.^[17]



Figure 3: Male-male adapter placed on the opening at the end of the oxygen tubing with oxygen flow pictured at 10 L/min. The open end is placed in the unobstructed nostril to create positive pressure for the expulsion of the foreign body.

A plastic swab is cut and the glue placed on the cut end, which is then pressed against the FB for 1 min while the glue dries. This technique risks application of the glue to the nasal mucosa itself, which may result in severe damage and inflammation. It should, therefore, be used with caution and only as a last line for visible FBs.

REMOVAL OF BUTTON BATTERY

Button batteries are found in certain electronic devices such as toys, hearing aids, and household appliances. If placed in the nose, strong electrical currents from the negative pole cause alkaline tissue necrosis of the nasal septum, risking perforation.^[18] Urgent removal is warranted. Importantly, topical anesthetic and/or vasoconstrictor drops should not be used.^[18,19] A right-angle hook or catheter may be used for removal as described earlier. The nasal cavity should be irrigated with copious amounts of normal saline following successful removal of the battery to ensure removal of any residual foreign material.^[18] Instruments with pointed and sharp grasping apparatuses such as cup forceps should be avoided as they risk perforating the battery casing. An otolaryngologist should be urgently consulted if removal is unsuccessful.

REMOVAL OF DISC MAGNET

Disc magnets are used as backings with certain jewellery. If they are placed in both nostrils, there is potential for them to attach to each other



Figure 4: The nondominant hand pulls the tip of the nose upward while the nasal speculum is manipulated with the dominant hand and a headlamp is used for illumination.

across the nasal septum, risking perforation.^[7] Removal may cause discomfort and bleeding, and so it is recommended to prepare the nasal surface with a lidocaine and vasoconstrictive mixture as described earlier.^[11]

The removal of disc magnets can be achieved using mosquito forceps to pull one magnet apart from the other. If this is unsuccessful, a pocket magnet pickup clamped to a hemostat may be used to magnetically detach one of the disc magnets.^[11] It may be helpful to use one magnet on each disc magnet to pull them apart. Yeh and Roberson describe such a method whereby two cardiac pacemaker magnets were applied to separate micro polypus forceps and operated by separate physicians to pull the disc magnets apart.^[7]

CONCLUSION

Intranasal FB removal can be safely achieved in the community emergency room or office setting with the right equipment and a cooperative patient. Posterior intranasal FBs, button batteries, and disc magnets may require advanced techniques and otolaryngology referral if the above-described techniques are not successful.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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