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Cover Art: Roni Hetzel, Meds 2018

Description: The cover art is a portrait of Blackie (Herman Lee) Wall, grandfather of Roni Hetzel, Meds 2018. This work captures the phenomenon of aging, demonstrating that although the physical body transforms, the elderly man has the same unique and defining human spirit as his younger self. This idea shapes the way we interact with our aging patient population, as we treat our patients with revered dignity that appreciates their personhood, past but also equally present.

Medicine's eternal struggle

The pursuit of human health is, in many ways, a never-ending battle. Winning one fight, curing one disease, or successfully managing one condition simply buys time for the next concern to arise. It is sometimes commented that the conditions that consume most of our time, attention, and resources in health care are the direct result of prior successes in medicine. One hundred and fifteen years ago, infections were the leading cause of death. As we improved our ability to combat these maladies, heart disease became our primary reason for leaving this world behind, followed closely by malignant neoplasms. The additional years of life gained when large swaths of the population no longer fell victim to influenza, tuberculosis, or the latest stomach bug gave more time for our coronary arteries to narrow or for malignant cells to grow and multiply within our bodies.¹

This diatribe may sound defeatist, but within the cold reality that medicine will never truly conquer death lies a rather comforting truth: medicine has become quite effective at denying our ultimate mortality for a significant period of time. Each medical discovery may only delay the inevitable, but the time bought can amount to decades. Indeed, though medical advances can only take credit for a portion of this change, life expectancy since 1900 has increased by approximately 30 years in North America.²

The emergence and expansion of geriatric medicine in many ways represents the clearest demonstration of the triumph of modern health care. With many more individuals living so long

we now need a whole field of medicine, with dedicated practitioners, to manage the unique challenges of growing old and remaining as healthy as possible at an advanced age.

It is difficult to overemphasize the importance of geriatric medicine at this juncture in history. The wave of baby boomers has begun the transition to retirement and the start of their senior years.³ Our health care system is in the midst of tackling tough questions on cost and sustainability, exploring new models of care and compensation, all with care for the elderly as a central concern.⁴ The recent Supreme Court of Canada decision on physician-assisted death has brought forth a new national conversation on the role of dying in medicine and society at large, a conversation with particular relevance for the elderly.⁵

It is in this context that the UWOMJ presents our issue on geriatric medicine. Challenges abound in the field of geriatrics. As we meet these challenges and, with luck, prove equal to them, new issues will arise to take their place. Yet, just as the problems posed in geriatric medicine today are the result of the successes of the past, so too will the problems of the future demonstrate the accomplishments of the present. We hope this issue provides a taste of both the unique challenges within geriatric medicine, as well as the potential solutions moving forward, contributing to an ever-brighter path to old age.

Craig Olmstead
Junior Associate Editor

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Multimorbidity in family medicine clerkship

The student perspective

Emily Harrison (Meds 2015)

Faculty Reviewers: Dr William E Osmun, MD, CCFP (Department of Family Medicine), Dr George Kim, MD, CCFP (Department of Family Medicine)

ABSTRACT

PURPOSE: To document senior medical students' experiences in caring for patients with multiple chronic illnesses in family medicine clerkship and explore their attitudes towards the inclusion of this topic in existing curricula.

METHODS: A cohort of third-year medical students from the Schulich School of Medicine and Dentistry at the University of Western Ontario were surveyed following their core family medicine clerkship.

RESULTS: One hundred percent of students surveyed participated in the care of patients with multiple chronic illnesses during their family medicine clerkship. However, only 28% percent reported receiving formal teaching on this topic while 89.5% felt that multimorbidity should be taught at the clerkship level. The majority of students surveyed felt comfortable caring for this patient population.

CONCLUSION: Patients with multiple chronic illnesses are common in family practice. All third-year medical students encountered patients with multimorbidity during their family medicine clerkship. This study contributes to a growing body of literature that suggests the need for a shift in medical education and health care delivery in order to better serve an increasingly complex patient population.

INTRODUCTION

Canadian medical undergraduate trainees enter clerkship in either their second or third year and for many this is their first exposure to clinical practice. Primary care educators are challenged with introducing medical students to the broad range of topics present in family medicine.¹ The Canadian Undergraduate Family Medicine Education Directors have published the Canadian Shared Family Medicine Clerkship Curriculum in an effort to provide learners with resources to supplement their clerkship experiences.² This learning tool provides objectives, reference cards and cases for 23 common presentations in family practice. However, there is no information relating to the management of patients with multiple chronic illnesses. Multimorbidity is defined as the presence of two or more chronic medical conditions within one individual.³ The prevalence of such patients is increasing, and family physicians play an important role in their medical care.³⁻⁸ Numerous studies have shown that patients with multiple morbidities experience a decreased quality of life, worse health care outcomes and lower level of functional status.⁴⁻⁸ It is important that medical trainees are appropriately trained to care for an increasingly complex patient population. Medical education and treatment guidelines are based

on a single-disease model and provide little guidance for the management of multiple chronic illnesses within one patient.^{3,6,9,10} Our previous work has shown that medical undergraduate educators agree that clinical clerks should be exposed to the management of multiple chronic illnesses in family medicine training; however, the majority of existing curricula do not address this topic.¹¹

The purpose of this study was to document medical students' experiences caring for patients with multiple morbidities and explore their perspectives on the teaching of multimorbidity in family medicine clerkship.

METHODS

A 12-item, paper-based survey was developed aimed at documenting students' experiences caring for patients with multiple chronic illnesses during their core family medicine rotation. Primary survey items explored students' attitudes towards receiving formal teaching on patients with multiple morbidities at the clerkship level. Participants were given the opportunity to provide further comments on their experiences caring for patients with multiple chronic illnesses as well as feedback on the survey in an open-ended question. Formal teaching was defined as structured learning that takes place in the following formats: lectures, resident

Table 1: Format of multimorbidity teaching in family medicine clerkship, choose all that apply (n = 13)

Answer options	Response percent	Response count
Lectures/rounds	38.5%	5
Topic presentations	15.4%	2
Small-group discussions	30.8%	4
Assigned readings	30.8%	4
Online case modules	0.0%	0
OSCE	0.0%	0
Resident teaching	76.9%	10
Other (please specify)	38.5%	5

Table 2: Do you feel that you have a practical approach to the management of patients with multiple morbidities in family practice? (n = 56)

Answer options	Response percent	Response count
Yes	55.4%	31
No	17.9%	10
Unsure	26.8%	15

ORIGINAL ARTICLE

Table 3: On a scale of 1-10, how comfortable are you with the management of patients with multiple chronic illnesses? (n = 57)

Answer options	1	2	3	4	5	6	7	8	9	10	Rating average	Standard deviation
Response Count	0	0	1	2	10	10	21	9	4	0	6.60	1.30

Table 4: Do you think that third year clinical clerks should be taught an approach to the management of patients with multiple morbidities during the family medicine rotation? (n = 57)

Answer options	Response percent	Response count
Yes	89.5%	51
No	1.8%	1
Unsure	8.8%	5

Table 5: If you have any further comments regarding multimorbidity in your family medicine rotation, please include them below (n = 6)

It's difficult to have an approach to multiple morbidities early on and I think it is something that comes with more clinical experience.
Seems very vague; not every patient will be the same. How extensive is the teaching going to be? Not sure if it's necessary.
Geriatrics during internal was the only place we really saw multimorbidity discussed - it was great, but a bit more would be nice.
IM had formal teaching in multimorbidity in the context of geriatrics.
Multimorbidity is the rule in family. We didn't learn a pocket approach.
Haven't done surgery yet so can't comment.

teaching, online modules and assigned readings. Students received surveys following the final assessment of their core family medicine rotation and completed surveys were entered into an electronic database for analysis. Third-year medical students who had completed their family medicine rotation at the Schulich School of Medicine and Dentistry between April 2014 and September 2014 were eligible to participate. Ethics approval was obtained from the University of Western Ontario's Research and Ethics Board.

RESULTS

Paper surveys were distributed to a total of 63 students and 57 were returned, giving a response rate of 90%. All participants were part of the 2015 class at Western University. Of these, 81% of respondents completed their family medicine clerkship in a rural setting, while 100% of respondents indicated that multimorbidity was common in family practice and 100% were involved in the care of patients with multiple chronic illnesses during their family medicine clerkship. However, only 28.1% received formal teaching on the management of such patients. Those who did receive formal teaching were asked to list the formats utilized by their preceptors during the core family medicine rotation (Table 1). However, of those who did not receive formal teaching on multimorbidity, 81% indicated that their preceptors discussed the management of patients with multiple chronic illnesses. Respondents were asked to indicate if they felt they had a practical approach to patients with multiple chronic illnesses (Table 2). Respondents were also asked to indicate on a 10-point Likert scale whether they felt comfortable caring for patients with multiple morbidities, 10 indicating a high level of comfort and 1 indicating a low level of comfort (Table

3). The average response was 6.60 (SD = 1.30). Respondents were asked to indicate whether multimorbidity should be included in formal teaching during the family medicine rotation (Table 4) and if they had received formal teaching on this topic in any other core rotation during their clerkship training. Internal medicine was the most common (48/50), followed by psychiatry (17/50) and surgery (10/50). Respondents were given the opportunity to provide any further comments about their experiences with multimorbidity in family medicine clerkship (Table 5).

DISCUSSION

All students surveyed were involved in the care of patients with multiple chronic illnesses during their family medicine rotation and the vast majority felt that third-year clinical clerks could benefit from formal teaching on multimorbidity. These findings further support the literature indicating that patients with multiple chronic illnesses are increasingly common in family practice and that medical education fails to address the needs of this patient population.^{3-8,10-11} Respondents indicated that they received formal teaching on multimorbidity in other clinical areas, internal medicine (48/50) being the most common. Interestingly, more than half of respondents indicated that they felt comfortable caring for patients with multiple chronic illnesses in a primary care setting, despite the paucity of formal teaching on this topic within the family medicine curriculum. It was surprising that the majority of students surveyed indicated a relatively high level of comfort in caring for such a complex patient population. However, literature on undergraduate education suggests medical students' ability to accurately assess their own performance and knowledge base is highly variable and often inaccurate.¹²⁻¹⁴ Future studies could focus on senior medical students' ability to self-assess their proficiency in caring for patients with multimorbidity.

The responses to the open-ended survey item, while few in number, suggest the need for further study on students' experiences caring for patients with multiple chronic illnesses. Focus groups with senior medical students could provide a more complete view of their experiences in family medicine clerkship and could be useful in the development of learning tools to aid in the care of patients with multimorbidity.

This study is not without limitations; our survey instrument was not previously validated, and respondents commented during the survey session that some items were unclear. We surveyed a cohort of third-year students exclusively from Western University and therefore our findings may not be representative of the experience of undergraduate trainees at other institutions.


Despite these limitations, this study speaks to the need for further development in family medicine undergraduate education beyond the single-disease model.

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Advanced care planning

A patient-centered approach to end-of-life care

Konstantinos Alexopoulos (Meds 2016)

Faculty Reviewer: Dr Ravi Taneja, MD, FRCPC (Departments of Anesthesiology and Critical Care)

INTRODUCTION

The scenario is all too familiar to the critical care physician working in a major teaching centre, or perhaps, even a peripheral intensive care unit (ICU) with limited capacity: an elderly patient is admitted to the emergency department status post-acute stroke. The patient has developed a high systolic blood pressure, a widened pulse pressure and abnormal respirations, which all point to increased intracranial pressure and a potential risk for brain stem herniation. A plan is made to admit the patient to the ICU for definitive management, which includes endotracheal intubation, ventilatory support, a hypnotic infusion and an osmotic diuretic like mannitol.¹ The following morning, the patient's family arrives and there are medical decisions to be agreed upon and executed through a family meeting. Up until this point in this patient's life, there has been no formal discussion between family members around the topic of end-of-life care.² No substitute decision maker (SDM) has been appointed. This culminates in family members vehemently disagreeing on what their loved one would have wanted. The critical care specialist physician is in a moral quandary. Like most things in medicine, effective advanced care planning is a prerequisite for success. However, there are always barriers to overcome in the process of planning, especially when it comes to death and dying.

Advance care planning (ACP) results in an advanced directive that expresses one's future preferences for medical decisions when one might be incapable of making such decisions.³ The goal of ACP is to improve patient-centred care and potentially reduce the intensification of care at the end of life.⁴ The ACP process is a top-down modus operandi. The big picture involves making the transition from living to dying as painless as possible from every facet: medical, physical, emotional, spiritual and religious. Unfortunately, these psychosocial needs tend to be forgotten in the early stages of managing a patient in critical condition. From a medical perspective, the ICU was developed in the mid-20th century to facilitate invasive monitoring and medical intervention to those critically ill or injured patients. Critical care medicine burgeoned into a mecca of technological and life-saving advancements.⁵ As a direct consequence of the development of the ICU, some physicians have proposed that Western society has overmedicalized the experience of death and dying. Rather than dying at home surrounded by friends and family, the elderly have been wasting away and dying in a sterile hospital setting.⁶ The idea of extending life without consideration for quality of life has been a topic of contention in the management and allocation of ICU-specific resources. Canadian physicians are having to come up against the harsh reality that these resources are limited. Being cognizant of this, physicians need to overcome their

inherent paternalistic instinct to keep a patient alive using invasive monitoring, vasopressors and mechanical ventilation. Failure to identify the point where medical intervention can unintentionally prolong patient suffering is a disservice to the patients and their families.

DISCUSSION

Patients who are terminally ill consistently identify their top priorities as avoiding suffering, being with family and not becoming a burden to others, but SDMs often do not realize this.² An example to illustrate this would be a patient with heart failure and underlying arrhythmia that resulted in the placement of an internal defibrillator/pacemaker. The patient's condition has deteriorated and the patient is admitted to hospital for medical management. Over the last few days of the patient's life, the family watches their loved one progress through the stages of dying. Intermittently, the defibrillator fires, causing discomfort to patient and family alike. Despite this, the patient's husband as her SDM refuses to deactivate the defibrillator because he does not want to be responsible for killing her. Herein arises the issue of education surrounding end-of-life care and decision making facilitated by an open dialogue between all parties involved.

ACP at its core is meant to be a process that facilitates communication and engages the participant in ongoing reflection.⁴ Ideally, ACP involves members of the healthcare team, family members and loved ones. A large barrier to the process is the unwillingness of some patients to engage in these discussions, because they are forced to face the gravity of their illness and prognosis. Conversely, physicians often avoid the topic because their paternalistic instinct hopes to shield the patients from the harsh reality of their mortality. While there is a certain degree of emotional upset that is bound to occur, most patients when offered a chance to discuss their wishes have found such conversations empowering.^{7,8} In modern medical practice, a patient-centred approach is emphasized and valued highly. However, it may be inappropriate to initiate ACP discussions at the onset of terminal illness. In doing so, we may be indeed asking the patient to predict the individual course of his or her disease process. This violates a core tenet of patient-centred care: that pathology is not experienced on a universal level by all. Rather, illness is defined as a unique experience within a biopsychosocial model that includes not only scientific fact, but humanistic factors like emotional and cultural differences.

Recent research at the Schlegel Institute for Aging at the University of Waterloo has provided some valuable insight to assist in guiding the patient experience in preparing for death and dying.

Less than half of those Canadians interviewed had discussed their preferences for end-of-life care with someone. An overwhelming majority believe that these discussions should be had with a family member. Most striking is that most Canadians believed they should think about or at least discuss end-of-life care while they are in good health.⁹ The barrier between patient and physician seems to be a problem of initiating the discussion in a manner which causes the least amount of stress for the patient.¹⁰ Yet, the physician requires an appropriate and a comprehensive strategy to be able to approach these discussions. There is no effective check-list approach to ACP. There exist some forms of checklist to facilitate discussion. However, death is shared universal event that is experienced very differently amongst individuals and their families.⁸ Successful ACP is reliant on a shared approach of open and honest communication between physician and patient.¹¹

Critical care physicians often engage in family meetings and are perceived to have some degree of competence in eliciting patients' wishes and facilitating decisions during the end-of-life period. The checklist approach to family meetings is one that does not consider individual patient experiences or prior knowledge of their disease and medical interventions like invasive monitoring and mechanical ventilation. Research by Scheunemann et al examined transcripts of 71 recorded family meetings. The findings suggest that a patient's values and preferences are explored poorly in discussion with surrogates. Patient preferences were not discussed at all in 30% of family meetings. Values like independence, known to be highly important to patients, was not discussed in 88% of those meetings. Yet, clinicians made explicit recommendations in 61% of conferences. The study has obvious limitations, so the results cannot be extrapolated to all patients and every ICU setting.^{11,12} The study was performed in two ICU settings in California. The authors purport that they observed younger physicians who specialize in internal medicine or neurology. The Hawthorne effect can also not be excluded. These physicians knew they were being observed for the purpose of study. Thus, the variety in physician behaviour and approach was not fully captured in this study. What can be inferred is the fact that physicians may not always be considering their patients' wishes and values.¹²

CONCLUSION

The shared care model of ACP, between patient and physician is something that needs to be examined further and expanded upon. Clinicians may not have elicited patients' wishes because of time constraints or a fear of upsetting the patient. Patients may be fearful to initiate the conversation and are simply waiting for a trigger to come along. In the context of patient-centred care, patients present with an issue and it is the responsibility of the clinician to assess and manage the complaint. If healthy patients were regularly prompted to think about end-of-life care in cooperation with their health care provider, it is likely that we would be better able to preserve some dignity in death by avoiding costly and unnecessary hospitalization.

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Modifications in anesthesia for geriatric patients

Brandon Chau (Meds 2018), Alexander Levit (MD/PhD 2020)

Faculty Reviewer: Dr Daniel Cuillerier, MD, FRCPC (Department of Anesthesia and Perioperative Medicine)

ABSTRACT

The volume of geriatric surgery is expected to increase dramatically by 2020, requiring a more widespread appreciation of the unique risks and challenges of anesthesia in the elderly. Changes in pharmacokinetics along with age-related changes in organ function have important implications for patient monitoring and dosing of anesthetic, analgesic, and sedative medications. Preoperative screening for risk of postoperative morbidity is improved with an assessment of activities of daily living, and regional anesthesia may be considered to reduce the risk of postoperative delirium, although this remains controversial. Specific homeostatic parameters should be closely monitored in the perioperative period. The approach to anesthesia in geriatric patients should not be merely extrapolated from younger patients, and further evidence specific to geriatric anesthesia will improve surgical outcomes.

It is no secret that our population is aging, with an estimated 50% increase in the over-65 population by 2020 from 2001. Older patients also have invasive procedures at nearly quadruple the rate of younger patients, particularly in ophthalmology and cardiology (9- and 2.5-fold, respectively).^{1,2}

Across a variety of surgical procedures, a linear increase in the absolute risk of surgical morbidity is observed with age, increasing from 11% in 20-29 year old patients to 49% in octogenarians. Surgical mortality increases exponentially with age, with a dramatic increase from the fifth decade of life, reaching 6% in octogenarians as compared to 0.4% in patients in the 20-29 year old cohort. While the prevalence of risk factors is correlated to age, age remains an independent risk factor for postoperative morbidity and mortality.³

As human physiology changes with age, it has been widely shown that pharmaceutical drugs have correspondingly modulated pharmacokinetics. The drugs in the anesthesiologist's arsenal are no exception, and this article will review concerns that the anesthesiologist must take into consideration when treating the geriatric patient. More specifically, this article will discuss considerations for planned surgeries, rather than emergent operations, in order to focus on the importance of preoperative screening and proper follow-up.

PHYSIOLOGICAL CHANGES OF AGING

Pharmacokinetic changes in drugs

There are important age-associated body compositional changes with implications for pharmacokinetics. Reduced relative water content and increased fat percentage result in a higher serum drug concentration after bolus injection and longer half-lives for lipid-soluble drugs. Declining cardiovascular function can slow drug delivery to tissue sites, resulting in a slower onset of action.

Decreased albumin content and protein binding results in a higher volume of distribution of acidic drugs. The opposite is seen for alkaline drugs.⁴

As the human body ages, gradual deterioration of all body systems also results in reduced hepatic and renal metabolism and excretion, impaired cardiovascular distribution and disrupted fluid homeostasis. Although the liver and kidneys display minimal structural changes with aging, it has been found that P450-dependent oxidation decreases, meaning that hepatically cleared drugs (eg propofol) have a longer half-life.⁴

Pharmacodynamic changes in drugs

Decline in cardiovascular health, especially through stiffening of the blood vessels and cardiac decline, is a leading risk factor for peri- and postoperative morbidity. Cardiac decline describes diastolic dysfunction and an increasing dependence on sympathetic drive and the Frank-Starling mechanism. Increased central nervous system dependence of cardiac function often manifests as a marked decline in blood pressure with anesthesia induction.⁴

Inhaled anesthetic agents such as sevoflurane and desflurane remain agents of choice for North American anesthesiologists, despite the still-unclear mechanism of action. It is therefore important to recognize that inhaled drugs have a decreased minimum alveolar concentration (MAC) in geriatric patients due to a greater sensitivity; whereas the MAC of isoflurane in the pediatric patient is 1%, it is 0.25% in the 95-year-old patient. Geriatric patients also exhibit a higher sensitivity to opioids and benzodiazepines, so it is important for the anesthesiologist to carefully titrate administration of narcotics to minimize toxicity while maintaining effective pain management.^{4,5}

PRACTICAL CONSIDERATIONS IN THE OR

Since geriatric patients are often receiving polypharmaceutical treatment, it is important to conduct physiologic optimization and to minimize premedications (eg heparin, diuretics). Preoperative risk factors (eg hypertension, dyspnea) have been identified to be more important than intraoperative events (eg transient hypoxemia, apnea) in predicting postoperative morbidity.

While preoperative screening is common practice in most centres, it is important to be more thorough with elderly patients and to complete a comprehensive history and physical exam. Many abnormal lab values, including anemia, creatinine, and hyperglycemia, are less effective than history and physical examination at predicting postoperative morbidity.^{6,7} To that end, a geriatric assessment is recommended for elderly surgical patients; 6 questions regarding activities of daily living and instrumental activities of daily living have been shown to identify 98.5% of elders with postoperative morbidity (Table 1).⁸

Table 1: Sample 6-Item Pre-Op Questionnaire⁶

Ascending/descending stairs
Urine continence
Walking in a corridor
Bathing
Shopping
Food preparation

Perioperative considerations and patient management

Control of body temperature is essential for successful surgery as anesthesia can lead to hypothermia. This effect is further pronounced in the geriatric patient because baseline hypothalamic function often declines, leading to impaired thermoregulation, especially with general anesthesia. Since even mild hypothermia can lead to infection or myocardial infarction, the anesthesiologist must be particularly vigilant with maintenance of body heat in the elderly.⁹

Because age-related deterioration of renal and cardiac function negatively impacts fluid homeostasis, it is prudent to carefully monitor blood pressure when administering IV fluids and to be watchful for renal overload. It is particularly important to meticulously pay attention to water balance, drug dosing, and maintenance of normal intravascular volume to keep patients healthy.¹⁰

Changes in pulmonary physiology also result in increased physiologic dead space due to compliant airways, so minute ventilation should be increased, and positive end-expiratory pressure can also be considered. Nasal cannulas are also indicated for virtually all elderly patients due to declining respiratory function and reserve.⁹

As suggested above, the recommended doses for drugs are nearly globally decreased in the elderly. A more comprehensive table is provided (Table 2).⁵

Table 2: Recommendations for Dosage Adjustment Consequent to Altered Pharmacokinetics and Pharmacodynamics in the Elderly⁵

Class of drug	Dosage adjustment
Barbiturates	Modest reduction in bolus dose and infusion rates
Etomidate	Reduction of up to 50% in bolus dose
Propofol	Reduction of 30-50% in bolus dose and infusion rates
Benzodiazepines	Reduction of up to 75% in bolus dose and infusion rates
Opioids	Reduction of up to 50% in bolus dose and infusion rates
Non-depolarizing neuromuscular blocking agents	No reduction in bolus dose, but generally reduced infusion rates depending on the drug
Volatile agents	Reduction in inspired concentrations of 6% per decade of age
Local anesthetics	Small to moderate reduction in segmental dose

Postoperative monitoring

It is important to be aware of postoperative morbidities such as cardiovascular damage and stroke. Intraoperative complications, which happen in 20% of geriatric patients, lead to a 6-fold increase in morbidity. Hospitalization has also been identified as a risk factor for postoperative morbidity, so when possible, outpatient surgeries are especially recommended for geriatric patients as this generally reduces nosocomial risk in all patients. Finally, since delirium and dementia can also occur in the geriatric population after anesthesia, it is important to monitor for changes in mental status during follow-up.^{7,11}

CONCLUSION

With the geriatric population projected to increase, compounded with an increasing rate of surgery and of morbidity/mortality risk in patients over 65, it is important to understand the concerns about anesthesia in elderly patients and to appreciate where extra vigilance is required. Due to a global decline in physiological function and reserve, drug pharmacokinetics are often severely affected. Declining fluid and temperature homeostasis also imposes more responsibilities on the anesthesiologist. Finally, certain classes of drugs, such as opioids and inhaled anesthetics, demonstrate a markedly increased potency in the elderly patient, necessitating careful titration to avoid toxicity. The field of geriatric anesthesia is increasing in importance because extrapolation of knowledge from younger patients may not accurately apply to elderly patients. Best practice guidelines may need to change as more geriatric-specific evidence emerges in the coming years.

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Frailty

Pei Jun Zhao (Meds 2017), Stefan Rodic (Meds 2018)

Faculty Reviewer: Dr Laura Diachun, MD, FRCPC (Division of Geriatric Medicine)

INTRODUCTION

Frailty is a term often used by both medical experts and laymen, yet defining the concept proves to be more difficult. Frailty is not just aging, though its prevalence increases with age.¹ A person who is frail may show no symptoms of disease, no co-morbidity, nor disability, but is more susceptible to rapid decline in the event of illness. Then how do physicians track this condition and communicate accurately with colleagues? And what are the implications of frailty and its clinical significance?

In broad terms, frailty is a constellational phenomenon consisting of weakness, aging, declining physiologic reserve, and impaired cognitive capacity. This increased vulnerability from age-associated functional decline results in a reduced ability to cope with everyday or acute stressors.² Although loosely defined, frailty has been found to be a prognostic indicator of recovery after illness, hospitalization, and surgery.

DEFINITIONS

Currently, there are at least 27 different measurements of frailty described in literature, each with its own focus and advantages.³ Depending on the definition, the prevalence of frailty in people age 65 or greater is estimated to be around 10.7%.⁴ It increases with age and with chronic comorbid conditions. However, there is currently no consensus on a preferred definition. Here we introduce a few common ways that physicians characterize frailty.

The Frailty Phenotype (FP) is defined as having 3 or more of unintentional weight loss (≥ 10 lbs or 5% body weight per year), grip weakness (≤ 20 th percentile), exhaustion (self-reported), slow gait velocity (≤ 20 th percentile), and low physical activity (based on a questionnaire).⁵ It is shown to be an independent prognostic factor for falls, worsening activities of daily living, hospitalization, and death. While FP provides a concrete definition, some of its components such as grip strength measurement are more technical. Also, the physical activity questionnaire is time consuming, making FP less practical for routine clinical use.⁶ Since then, a variety of more clinically friendly tools have been developed.

One of these tools is the Clinical Frailty Scale (CFS). CFS evaluates the presentation of frailty on a scale of 1 to 7, taking into account mobility, assistive devices, energy level, comorbidities, physical activity, and functionality.⁷ A series of pictographs is even available to facilitate the diagnosis. A recent study assessed a group of seniors using both the CFS and the Frailty Phenotype, and concluded that the 2 tools have a high concordance.⁶

In general, a frailty assessment involves functional evaluation along with other indicators to form a comprehensive picture. The “timed up and go” test is a classic motor assessment that involves a patient rising from a seated position in a chair, walking 3 meters forward, turning around, then walking back to the chair and sitting

down.⁸ This test requires both static and dynamic balance and is closely related to mobility in everyday life. Moreover it is quick and can be easily included in the comprehensive geriatric exam.

Combining motor function and other indicators, a variety of frailty indexes have been proposed, including one outlined in the Survey of Health, Aging and Retirement in Europe (SHARE), a population-based longitudinal study. The criteria include reported fatigue, low appetite, weakness, observed gait (walking without help, with help, chair-bound, bed-bound, unobserved), and low physical activity. The SHARE frailty instrument also correlates with overall mortality.⁹

PATHOPHYSIOLOGY

One of the hallmarks of frailty is a decline in physiologic reserve. A number of systems are affected, such as the musculoskeletal, endocrine, immune systems, and the brain.¹⁰ Sarcopenia, for instance, directly contributes to the decline in functional ability.¹¹ In the endocrine system, changes in insulin-like growth factor (IGF), sex hormone, and cortisol secretion are also associated with frailty.¹² Cognitively, frailty is associated with a higher incidence of mild cognitive impairment in the elderly.¹³

Moreover, frailty is an inflammatory state.¹⁴ The frail elder has chronically elevated levels of inflammatory markers compared to robust older adults. Interleukin 6 and C-reactive protein are present in low grade inflammation, and are associated with morbidity in the geriatric population. But it is uncertain whether frailty leads to inflammation or vice versa. This inflammation leads to a catabolic state contributing to weight and muscle loss.¹⁵ Furthermore, antibody responses to vaccinations are reduced, leaving frail patients at an increased risk of contracting infections such as influenza.¹⁶

The causes of these physiological changes are complex. Frailty upsets the delicate balance of homeostasis, leading to loss of physiologic reserve. With more research into the pathophysiology of frailty, biological markers may potentially be combined with functional assessment to evaluate frailty in the clinic.¹⁷

IMPLICATIONS

Slow gait speed, low physical activity, weight loss, and cognitive impairment are associated with chronic disability, long-term nursing home stays, and mortality.¹⁸ Hospitalized patients who are frail have increased risk of developing delirium.¹⁹ Preoperative frailty is associated with higher postoperative complications, length of stay, and discharge to assisted-living facilities.²⁰ Kidney transplant recipients who are frail have delayed graft function.²¹ Thus, assessing frailty is important in planning elective procedures and during the course of hospital stay. It can also serve as a prognostic factor for expected patient recovery.

After a patient is recognized to have frailty, there are ways to slow its progression. Currently, medications and hormone supplementations are not recommended,²² but avoiding polypharmacy is frequently beneficial.²³ Interventions mainly involve lifestyle changes and supportive care.²⁴ For example, nutritional counselling and micronutrient supplementation can help maintain weight.²⁵ Resistance exercises can be prescribed to strengthen hips and knees.²⁴ Finally, home visits, social support, and outpatient care together construct a holistic patient centered environment for frail patients.²⁶

CONCLUSION

Frailty is an important condition affecting seniors, and contributes to morbidity and mortality during the course of medical care. There are many definitions of frailty. However, there is not yet a consensus for any single set of diagnostic criteria.²⁷ We must recognize that frailty is a complex medical condition. The various criteria assess this condition from different angles, such as muscle strength, cardiovascular status, and activities of daily living. Physicians need to weigh and balance these perspectives and keep in mind the larger picture when making clinical decisions for their patients, such as whether or not to perform elective surgery. In an aging population, physicians will be taking care of an increasing number of elderly patients. The recent increase in literature on frailty reflects its growing recognition and importance. Thus, an understanding and appreciation of the evaluation, impact, and management of frailty is critical to future health care in Canada and around the world.

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Research concerning older adults with dementia

Adriana Cappelletti (Meds 2018)

Faculty Reviewers: Dr Monidipa Dasgupta, MSc, MD (Division of Geriatric Medicine), Dr Raza M Navqi, MD, FRCPC (Division of Geriatric Medicine)

BACKGROUND

Geriatric patients are often underrepresented in clinical research,¹ in part due to underrecruitment and to their often arbitrary exclusion from trials.^{2,3} Recruitment is especially difficult in older patients with language barriers, access barriers to leaving the home, and diseases that impair decision-making capacity.^{1,2} The paucity of geriatric research is troubling given Canada's aging population,⁴ as research findings in younger study participants may not be generalizable to older patients.⁵ This lack of evidence is problematic for health care providers, who must decide whether prescribing certain treatments to older patients is appropriate without the proper evidence base.¹

Unique ethical and legal challenges exist surrounding recruitment of incapacitated older patients, specifically within the context of dementia. Between 44% and 67% of patients with mild-to-moderate dementia do not have the decision-making ability to consent to participating in research, and all patients with severe dementia are considered incapacitated.⁶ However, their inclusion in research is essential to furthering investigators' understanding of dementia. For example, both cerebrovascular and cardiovascular disease (CVD) have been associated with cognitive decline; without the participation of patients with late-stage dementia, researchers cannot thoroughly investigate how CVD influences the progression of cognitive decline or, contrarily, how dementia may put a patient at risk of CVD.⁷ This article explores how older adults with dementia may be included in clinical research while protecting these older adults from coercion or harm.

LEGAL STANDARDS FOR DECISION-MAKING

In considering the legal challenges of geriatric research in incapacitated older populations, it is important to first define capacity. Although not a universal definition, the "four abilities model" devised by Appelbaum and Grisso describes four criteria to define legal standards of capacity: being able to reason about options, communicating a decision, understanding the context of that decision and appreciating its foreseeable consequences.^{6,8,9} Many patients with dementia do not meet these standards of capacity and are thus unable to provide consent themselves when participating in research.^{6,10} In Canada, the Tri-Council Policy Statement (TCPS) on Ethical Conduct for Research Involving Humans dictates that only a substitute decision-maker (SDM) who is not part of the research team may authorize an incapacitated adult's participation in research.¹¹ Although the SDM's consent is required for participation, the patient's dissent (ie objection) to participation overrules the SDM's decision.^{11,12} Therefore, investigators should provide incapacitated patients with as much information about the trial as

patients' understanding will allow, in an effort to obtain their affirmative agreement, otherwise known as their assent.¹³ In the context of dementia, assent is defined as the ability to express a choice and at least a minimal understanding of the information provided. The inability to communicate a choice and thereby provide assent does not preclude a patient with dementia from participating in research; however, assent is required for patients who have this ability, and dissent to participation is unequivocal.¹²

The TCPS also states that incapacitated adults may only be recruited for research specifically requiring their participation (eg an Alzheimer's disease treatment study) and involving either minimal risk or risk that is outweighed by potential direct benefits.¹¹ These standards parallel the protective measures in place for paediatric research.¹⁴ There is no clear threshold of when potential risks outweigh direct or indirect benefits. Thus, to balance scientific inquiry with protection of patients, review of protocols for research of incapacitated older adults must consider broad risk-benefit categories, and protocols with no anticipated benefits to study participants require more conservative risk-benefit analyses.¹⁰

ETHICAL CONSIDERATIONS

The decision to include an older, incapacitated participant in research must respect that individual's values and address principles of beneficence, non-maleficence and justice.^{15,16} There is disagreement in the literature regarding the most ethical approach to making this decision. Two commonly considered approaches are "best interests" and "substituted judgments". In substituted judgments, the SDM makes a decision based on what the participant may have believed, thereby aiming to respect the participant's values and wishes. A concern with substituted judgments is that often an SDM may be unaware of the patient's prior wishes since consent to research is not routinely incorporated in a patient's advance directives.¹⁷

In contrast to substituted judgments, which emphasize the patient's prior wishes, "best interests" values the SDM's opinion on what is best for the patient. "Best interests" aims to maintain the older adult's quality of life and avoid unnecessary harm, should the intervention pose risks.¹⁷ Making this judgment is challenging in the case of established treatments and becomes even more so when evaluating an experimental treatment with unknown risks and benefits. Another concern with this more paternalistic approach is the possibility of the older adult's previous wishes being disrespected.

With either approach, it is very difficult to determine whether a person without the ability to consent would be interested in therapies with potential risks that may prolong life without improving quality of life.¹⁵⁻¹⁷ However, the potential benefits of this research to

patients with dementia cannot be uncovered unless resources are justly allocated towards studies involving this population of incapacitated older adults.

FUTURE DIRECTIONS AND CONCLUDING REMARKS

In the context of research involving older, incapacitated adults, be it with dementia or other mentally impairing diseases, the best course for recruiting patients is not clear. Inclusion of incapacitated participants is essential to enhancing our understanding of dementia and might have direct neurological benefits on these individuals.^{6,10} However, SDMs face the challenge of weighing the risks and benefits of clinical research to their relative, often having to speculate what their relative's wishes would be.¹⁷ To address this concern, interest in research trials should be discussed with individuals with early dementia while they are still able to decide for themselves.

Involvement of incapacitated older adults in research trials may also be improved by training research personnel on evaluating capacity,⁶ by avoiding arbitrary upper age limits in protocols and by addressing access and transport requirements of older adults.² Additionally, expanding academic geriatrics and involving a greater number of geriatricians on research boards would help to promote geriatric research overall.¹

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Modifying the healthcare system to accommodate our aging population

Adam Kovacs-Litman (Meds 2018), Michael Hewak (Meds 2016)

Faculty Reviewer: Dr Chris Brymer, MSc, MD, FRCPC (Division of Geriatric Medicine)

In the last 150 years, advances in the field of medicine have extended the average lifespan in the Western world by over 3 decades¹ and this trend shows no signs of slowing down. If current forecasts are accurate, a third of all babies born in the Western world today will live past their hundredth birthday.² A century ago, this demographic shift had primarily been due to reduced infant mortality and better infection control, and this trend has continued more recently due to better management of chronic conditions like cancer and heart disease.¹ Nearly half of provincial/territorial government healthcare spending is allocated to seniors (those 65 years of age and older), but our aging population will only cause this proportion to increase, likely reaching unsustainable heights.³ This ongoing demographic shift will force us to balance economic sustainability with the effective care of seniors in hospital, postdischarge, and at end-of-life.

A report by the Canadian Institute for Health Information illustrated the current financial burden of seniors on the healthcare system quite handily. While adults aged 15-64 cost our healthcare system an average \$2286 per capita annually, health spending on seniors was \$10 742 per capita. Furthermore, the financial cost for those seniors aged 80 years and over cost the system a staggering \$18 160 per capita.⁵ This provides a significant challenge for our healthcare system, as it is projected that over the next 25 years, the proportion of the Canadian population 65 and over will jump from 14% to 25%.⁴

Although longevity is expensive, technically speaking, it is not age itself that increases healthcare expenditure but rather the number of chronic diseases an individual possesses, which tend to rise with age. Indeed, between 50-60% of seniors suffer from three or more chronic diseases, compared to 15-30% of those aged less than 65 years.⁶ Most chronic conditions are self-managed by patients and their families at home until patients are typically in their late 70s. Unfortunately, while hospitals are often exceptional at treating patients with acute conditions, their management of patients who require chronic care is often fraught with inefficiency, fragmentation, and poor outcomes.^{3,7}

Alternatively, long-term care (LTC) facilities are structured around the rehabilitation and continued management of patients with these chronic and often deteriorating conditions.⁸ They are institutions designed to fill the gaps created by our hospital-centric system, yet they are woefully underutilized by policy-makers. Though the plan is always to transfer chronic patients to LTC or home care, our system is ill-equipped to meet this growing demand. In Ontario alone there are 2000 waiting in hospital beds for LTC. Of the 1000 of these waiting in acute care hospital beds, three quar-

ters will be placed in LTC within 10 months; however 15% will pass away while on the wait list. And this demand-supply mismatch is only getting worse with the median wait time tripling from 2005 to 2012.⁹ What makes this issue even more frustrating is that one day in a hospital costs the province approximately \$1000, while comparable LTC costs only \$137.10 and homecare just \$55.11. Focused investment in LTC would not only improve patient outcomes for the chronically ill, but also save the healthcare system money by freeing up acute care beds, thereby allowing hospitals to better treat those with acute illness.

Seniors with chronic needs occupying acute care beds is a ubiquitous problem in our healthcare system that will only worsen as our population continues to age. The term “Alternate Level of Care” (ALC) describes this phenomenon—patients who have completed the acute phase of their management in hospital, yet continue to occupy an acute care bed. Currently, seniors comprise 40% of acute hospital stays in Canada, and of the 85% of such stays that were designated ALC, nearly half were waiting to be placed in an LTC facility.¹²

At Mount Sinai Hospital in Toronto, a program called the Acute Care for Elders (ACE) Strategy has shown great promise as a model for streamlining senior care and reducing the number of ALC patients. The premise of ACE is to implement a higher level of integration across the multiple modalities of healthcare and social services a patient might be receiving across a variety of locations—namely the home, community, and hospital. For example, part of ACE involves screening seniors who present to the emergency room for risk factors that might predict poor outcomes, then adjusting both in-hospital and postdischarge care accordingly. Specialized inpatient geriatric consultation teams manage issues that contribute to functional decline, and aim to avoid hospitalization altogether if possible. Upon discharge, patients are meticulously followed and receive ongoing homecare via partnerships with local organizations, geriatricians, and geriatric psychiatrists. In just one year, the project saw tangible reductions in average length of hospital stay and hospital readmission rates, and patient satisfaction with this program was polled at 97%.³ The cost and cost effectiveness of the resources required to achieve these gains has not been determined yet, however.

Studies have shown that within 30 days of being discharged from the emergency department, 8% of seniors are either readmitted to hospital or die, with an additional 16% returning to the ER.¹³ Integrated care systems such as ACE have been shown to keep seniors at home, reducing stress on the healthcare system by decreasing the quantity and length of hospitalizations, while simulta-

neously improving the level of access and quality of care received. The first four years of PRISMA, a similar integrated care project in Quebec, found a 50% reduction in unmet medical needs, a 20% reduction in ER visits, a significantly reduced number of hospitalizations and a 14% decrease in individuals experiencing functional decline.¹⁴ Again, the economic sustainability of this program has not been established.

It is clear that medicine works best when it is integrated as part of a multidisciplinary care system that is organized around the needs of the individual, but integration can come in many forms. Several studies suggest that case managers may be an invaluable tool in facilitating the care of the aging population. These are individuals (often nurses) who coordinate care from different providers, ensure that communication is maintained between members of the patient's healthcare team, and educate patients on what care they require and how to go about getting it. Furthermore they would arrange, coordinate, and oversee the home care for hospitalizable conditions such as pneumonia, congestive heart failure, and COPD. A trial of such a project in Australia involved assigning seniors a case manager to oversee their medical care, and resulted in 21% fewer ER visits and 28% fewer hospital admissions.¹⁵

The nuances of palliative care are another area where the hospital machine seems to fall short. The human condition is in part defined by our remarkable ability to hope even in the face of tremendous adversity, even in the face of hopelessness. Broaching the subject of palliative care seems to run contrary to our nature, forcing both healthcare providers and patients to address the uncomfortable subject of death. However, talking about death demystifies it and allows patient preferences to take shape. A randomized control trial looking at lung cancer patients found that those offered palliative care reported improved quality of life at 12 weeks.¹⁶ As guidelines continue to emerge and healthcare provider education improves, this is an area where we will continue to improve.^{17,18}

There was a time when most people died at home surrounded by their families—familiar faces in a familiar environment. Approximately 64% of people die in hospitals while another 12% pass away in LTC facilities.^{19,20} This sadly does not accurately reflect patient preferences, as literature shows that the majority of seniors prefer to die in their own home.³

As our population ages, palliative care will give the medical profession a tremendous opportunity to put the dignity back in dying, allowing people to pass away comfortably and with meaning. Talking about palliative care is a first step. The next step is to humanize death by listening to patients, helping them realize and articulate their preferences. This will not only improve the quality of a patient's last few months, but also relieve stresses on hospital resources, allowing for more effective care of other patient populations. The availability and flexibility of hospice and palliative home care, however, is a major factor in whether it is even feasible for end of life to occur at home.

The organizational, economic, and political complexity of implementing such significant shifts in the structure of our healthcare system is daunting, but necessary. As more research is done to elucidate the most cost-effective and patient-centered methods

of accommodating the rapidly changing demographic landscape, we expect to see increased funding and manpower being allocated to expanding LTC facilities. Further, we expect a greater focus on the use of programs and case managers that integrate each patient's unique mix of medical and social services. We also anticipate a greater emphasis on patient preference at end-of-life, and the development of better palliative care options. What is certain is that Canada's demographic landscape will see unprecedented change in the coming decades as medicine pushes the limits of the human lifespan beyond what was previously imaginable. The question that remains to be answered is how our healthcare system will manage to adapt to meet our aging nation's rapidly evolving medical needs.

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Physician-assisted death and the changing face of geriatric medicine

Matthew Douglas-Vail (Meds 2018), Keegan Guidolin (Meds 2017)

Faculty Reviewer: Dr Raza M Navqi, MD, FRCPC (Division of Geriatric Medicine)

INTRODUCTION

On February 6th, the Supreme Court of Canada ruled that the century-old law condemning assisted suicide was unconstitutional. This momentous ruling now opens the door for physician-assisted suicide.¹ This decision has left many wondering how this will affect geriatric, palliative, and end-of-life care in Canada. The ruling has been met with much controversy, leaving both physicians, and the public unsure how to apply these new rulings to everyday medicine. The terms “euthanasia” and “physician-assisted suicide” (or some variant thereof) have been used to describe the potential consequences of the ruling in the media, though these terms should not be obfuscated. These are two distinct acts, though this ruling makes both permissible. Materstvedt et al defined physician-assisted suicide as “a doctor intentionally helping a person to commit suicide by providing drugs for self-administration, at that person’s voluntary and competent request.”² Conversely, euthanasia is outlined as “a doctor intentionally killing a person by the administration of drugs, at that person’s voluntary and competent request.”²

HISTORY OF PHYSICIAN-ASSISTED DEATH

Prior to the Supreme Court ruling, the role of Canadian physicians in assisted suicide was clear. Criminal Code of Canada section 241(b) states “everyone who [...] (b) aids or abets a person to commit suicide, whether suicide ensues or not, is guilty of an indictable offence and is liable for imprisonment for a term not exceeding fourteen years.”³ The ethics surrounding physician-assisted suicide, however, are less clear. Many physicians currently employ the principle of double effect when taking care of palliative patients. In essence, double effect is the administration of any medication, often narcotics or sedatives, with the intent to palliate dying patients even though the administration of these drugs may hasten death. Interestingly, in places where physician-assisted suicide is forbidden, a “medical death” hastened by palliation is typically permissible.⁴ It is the intention that is most important in these cases as the physician is not intending to end life but rather chooses to focus on patient comfort at the expense of known drug side effects.

Physician-assisted suicide is inextricably linked to geriatric care. In 1997, Oregon legalized physician-assisted suicide. In the first year of legal physician-assisted suicide, the median age of physician-assisted suicide patients was 69, well within the jurisdiction of geriatrics.⁵ Of these patients, 86% had cancer, 21% were completely disabled, and all were terminally ill. A survey in the Netherlands also found that physician-assisted suicide occurred predominantly in elderly populations, with a median age of 71.

Surveys have also shown that elderly people would choose to undergo physician-assisted suicide to prevent becoming a burden to their families or others. These patients were quoted as saying, “I wouldn’t want to become a nuisance under any circumstance.” This provides some qualitative insight into why some healthy older individuals might support medical practices that hasten death. In the Netherlands, roughly 17% of patients request physician-assisted suicide because they are “tired of living” and 25% of those had no serious disease or no disease at all.⁶

Opinions on physician-assisted suicide are divided among physicians themselves. Many physicians believe that patients have a right to die with dignity, or that patients have a fundamental right to autonomy over their bodies. They may also want to help to alleviate the suffering endured by their patients with intractable or terminal diseases. Conversely, many physicians see physician-assisted suicide as a sign that current palliative care is inadequate. They may also believe that physicians should not take on the role of executioner. In addition, there is significant concern about the potential for abuse of power by physicians.

THE SUPREME COURT RULING

The Supreme Court ruling has profoundly altered the landscape of physician-assisted suicide. The court ruled “prohibition of physician-assisted dying infringes on the right to life, liberty and the security of the person.” The ruling states that adults who are enduring intolerable suffering can consent to ending their own lives. The court found that a person’s response to an irremediable medical condition was a matter of dignity and autonomy. As well, “by leaving people [...] to endure intolerable suffering, it impinges on their security of the person.” The court also highlighted the fact that in jurisdictions that have legislated physician-assisted suicide such as Oregon and the Netherlands, the safeguards put in place have been effective. In an unusual move, all 9 justices shared credit for the ruling, a move intended to lend institutional weight to the ruling. Technically, the court has given the federal government 12 months to write legislation to respond to, or attempt to overturn, the ruling. If legislation is not put forth, physician-assisted suicide will be in a situation similar to that in which abortion resides: legal and left to the medical profession to regulate without government oversight.¹

The ruling is not limited to those who might require assistance to end their lives, for example patients suffering from amyotrophic lateral sclerosis (ALS). It is unclear whether an intractable psychiatric condition might qualify as an “irremediable medical con-

dition”, since psychological pain has not been addressed directly. Instead, it is left up to physicians and lawmakers to determine what qualifies as “enduring and intolerable suffering.” Under the new ruling, physicians are not compelled or required to help patients end their lives, it merely removes prohibitions against it.¹ The Canadian Medical Association (CMA) is presently encouraging physicians to “follow their conscience” when making these decisions.⁷

THE ROLE OF THE CMA

The CMA has been bracing itself for this decision. For a year and a half, the organization has been debating and researching how to best handle physician-assisted suicide. As the president of the CMA, Dr Chris Simpson acknowledges physician-assisted suicide requires physicians to make decisions that go to the “very gut of one’s personal ethics and morals.”⁸ The CMA organized town halls and reviewed physician-assisted suicide practices in other countries, most notably Oregon and the Netherlands. In August 2014 at the CMA’s annual general meeting, members voted 91% in favour of a motion to allow physicians “to follow their conscience when deciding whether to provide medical aid in dying.”⁹ Although this is not a formal regulation, it speaks to the general consensus of physicians’ opinions on physician-assisted suicide regulations. This resolution also signals a changing of policy for the CMA, an organization historically opposed to both euthanasia and physician-assisted suicide.

THE CHANGING ROLE OF THE GERIATRICIAN

The emphasis on quality of life in end-of-life care and advanced planning discussions suggest that geriatricians will be at the center of the physician-assisted suicide discussion. Geriatricians focus on holistic, person-centered care, which often centers on quality of life rather than its duration. Geriatricians often decrease pill burden in patients who would rather take fewer medications, even at the expense of living for a shorter time, for the sake of fewer side effects.⁶

With the emphasis on holistic care and quality of life, physician-assisted suicide is well within the realm of geriatric medicine. The question remains however, how will this new ruling change the role of these physicians? It could theoretically alter the landscape of the principle of double effect. This ruling may require geriatricians to discuss the option of physician-assisted suicide with their patients suffering from irremediable medical conditions. As well, physicians will potentially have to engage the families and the substitute decision makers of their patients, an unquestionably difficult conversation.

On a personal level, this will require geriatricians to grapple with their own moral and ethical opinions surrounding physician-assisted suicide. In a 2014 survey, only 27% of physicians reported that they would be “likely or very likely to participate in” physician-assisted dying. To that point, many provincial regulatory colleges (in Ontario, the College of Physicians and Surgeons of Ontario) require that physicians refer their patients to another

doctor if they refuse to offer controversial treatments. Historically, these treatments have included prescribing birth control and performing abortions. This list may now require expansion to include physician-assisted suicide. As Dr James Downar, a palliative care physician, explains, “we need to recognize that conscientious objection in this context can serve as a barrier and we need a very robust system to make sure that the physician’s right to conscientious objection does not impinge on the patient’s right to receive what would be a legal treatment.”⁸ This new Supreme Court ruling will profoundly alter the practice and culture of geriatric medicine.

CONCLUSIONS

The Supreme Court ruling declared that aspects of the Criminal Code were unconstitutional with respect to physician-assisted suicide. Prior to this ruling, the role of physicians in these cases was clear: they could not participate. With this new ruling, however, the landscape has changed. Physician-assisted suicide is closely linked to geriatric medicine, as we have seen in Oregon and the Netherlands. This new ruling may require that geriatricians discuss physician-assisted suicide as an option with their patients. It will certainly require geriatricians to reflect on their own beliefs surrounding physician-assisted suicide. This new ruling will reshape the practice of geriatric medicine in Canada.

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End-of-life care

Its founding purposes and values

Hao Li (Meds 2016), Stephanie Mokrycke (Meds 2017)

Faculty Reviewer: Dr Shelley McKellar, PhD (Department of History and Surgery)

In the midst of divisive public debates, we frequently look to history and past epochs to gain guidance and understanding, to explore the genesis of our ideas and practices, and to critically compare them with alternatives.

— Ezekiel J Emanuel, MD, PhD¹

THE VALUE OF HISTORICAL IDEOLOGY

The article from which this idealistic quote was taken from was published in 1994; however, one can question whether it was ever a habit of human thinking in these past couple of centuries to extract guidance from historical occurrences. CS Lewis in his 1955 book *Surprised by Joy* denounced the problem of “chronological snobbery”, which he defined as “the uncritical acceptance of the intellectual climate of our own age and the assumption that whatever has gone out of date is on that count discredited.”² He cautioned of the danger of chronological snobbery in another book. The premise was that if human civilization were currently heading down the wrong path, it is imperative that we return to that ill-chosen junction and “restart” our history on the right path. However, if we ignore the timeline of the previous stages of our journey, we risk losing the opportunity to return and start over.³ Quoting now a member of our own profession, Eugene F Cordell, President of the Medical and Chirurgical Faculty of Maryland in 1904, he lamented in an address that “it [was] rare to find the subject [history of medicine] even mentioned in the curricula of the medical schools.”⁴ He then attributed this phenomenon to an unhealthy obsession with novelty, the unwillingness to make time for reflection, and the increasingly utilitarian and mechanical nature of human mentality.

An appreciation of historical ideology is crucial to a rigorous and unbiased study of that branch of geriatric medicine which is so ubiquitous and fiercely debated: end-of-life care. This is because end-of-life care is not only a medical science, but also a philosophy. It is a value-laden specialty with a complex past. Currently, there exist several approaches to end-of-life care, and in every case where a patient is enduring his or her last few days, these approaches seem to compete for primacy. Proponents of each argue for their case, but rarely do they appeal to the historical values behind the method. Yet it appears obvious that if we choose to use the term “end-of-life care”, we should at least explore the ideas and motivations of the predecessors from whom we inherited the term. This article will discuss 3 approaches to end-of-life care—palliative care, life-sustaining therapy, and euthanasia—and illustrate how attention to the historical evolution of their philosophies can enrich our

understanding of them. It is hoped that the reader will emerge with a deeper knowledge of the rationale behind each approach, as he or she explores their genesis and development.

PALLIATIVE CARE

Something can be learned about palliative care simply from studying its linguistic roots. The term palliative derives from the Latin verb *palliare*, meaning “to cover up” or “to conceal.”⁵ In the context of healthcare, that which is covered up is the pain and suffering associated with end of life. The first record of palliative care came from 4th-century Rome, where a Christian matron named Fabiola opened her home to pilgrims, the sick, and the destitute.^{6,7} She called her home a “hospice.” During the Middle Ages, it became a Christian tradition to take in the sick, poor, pilgrims, and crusaders. While none of these primitive hospices cared specifically for the dying, they do illustrate that the underlying principle of the earliest palliative care was charity.

During the 19th and 20th centuries, hospices specializing in end-of-life palliative care opened in France (1842), Dublin (1879), and London (1905). But it was not until 1967 that Dame Cicely Saunders established St Christopher’s Hospice in London, considered to be the first modern research and teaching hospice. It was founded on three principles: openness, mind together with heart, and freedom of the spirit. Saunders was trained first as a nurse, then later as a physician. In her early days she cared for a terminally ill cancer patient who endured a horrendous measure of suffering before his eventual death. Touched by their interaction, she came to realize the importance of symptom and pain control for the dying. At the same time, she saw an even higher need for the dying to come to terms with their mortality, a goal which requires both emotional and spiritual support.⁶

These historical revelations led to Saunders’ definition of “total pain,” a term familiar to many ears today. This was a new model of medical suffering which incorporated the biological, psychological, social, as well as spiritual natures of the patient. After completing her medical training, Saunders conducted an extensive amount of research on palliative care. Her research style consisted mostly of listening to patients and studying their narratives, by which she was able to pinpoint the individual needs of every patient as they lived out their final moments. Our capsule summary of Dame Cicely Saunders’ work shows that many concepts in modern palliative care that we take for granted today derive from her philosophy. No understanding of palliative care can be complete without a study of her life and motivation.⁶

LIFE-SUSTAINING THERAPY AND EUTHANASIA

The modern controversies surrounding life-sustaining therapy, such as artificial nutrition or hydration and cardiopulmonary resuscitation, are anything but “new.”⁸ Due to advancements in medical technologies and the management of chronic disease states as early as the 19th century and early 20th century, there resulted a shift in the culture of medicine from care to cure.⁹ Life-sustaining therapy allowed medicine to keep a patient alive indefinitely in the hopes of eventually finding a cure. However, in a desperate attempt at cure, palliation of pain and symptoms is often sacrificed, a concept recognized even in the 19th century. Simeon E Baldwin, in his 1899 Presidential Address to the American Social Science Association, recounted the tale of a patient, terminally ill with stomach cancer, who was sustained by injections of mutton broth. Her agony was so great that “her stomach refused to retain anything but a little water; and even that caused great pain.”¹⁰

On the other extreme of the end-of-life spectrum is euthanasia. Whereas life-sustaining therapy aims to maintain life indefinitely, euthanasia seeks to terminate life altogether in the face of suffering. Although some may see euthanasia as a recent issue, referring to its legalization in 2002 in the Netherlands, the ethics of euthanasia has actually been debated for at least several centuries.^{11,12} Familiar arguments for euthanasia include that it is a human right born of self-determination and that it brings an end to suffering which has otherwise no hope of alleviation. In fact, the Flemish Palliative Care Federation believes that “euthanasia may [...] be part of palliative care.”¹³ Indeed, the philosophy of euthanasia emphasizes pain relief and listening to patients’ individual needs, virtues seemingly in line with historical values of palliative care.

Notably, much of the continued resistance to euthanasia may also refer to historical sources. It has been questioned as early as 1936 whether euthanasia truly provides biopsychosociospiritual support, as it essentially puts the patient that is being “supported” out of existence.¹⁴ In the Netherlands, 33% of the patients who opt for euthanasia do so because of a repulsion of being dependent on others.¹⁵ However, this seems to defeat the entire underlying principle of the earliest palliative care, which is that people ought to help one another in the name of charity.¹

Therefore, modern arguments both for and against euthanasia may in fact be rooted in historical philosophy. Proponents advocate for pain relief and respecting patients’ personal needs, concepts established by Dame Cicely Saunders. Opponents question its true nature and whether it is really designed to support patients at the end of life for the sake of charity. However, it is noteworthy that most of those who support euthanasia do so with the intent of upholding those values that form the foundations of palliative care. As shown throughout history, the nature of end-of-life care evolved from an innate desire to help, not to ruthlessly eliminate.

CONCLUDING REMARKS

The purpose of this article is not to promote an opinion on which approach to end-of-life care is optimal. Rather, it is meant to briefly foster an appreciation of the historical purposes and values behind each approach. In a day and age where end-of-life care is in-

tensively debated, advocates of each option are eager to voice their own opinions based on the most current research and experience. However, they often forget that “no generation can bequeath to its successor what it has not got” (CS Lewis),¹⁶ which implies that our ideas and thinking are actually a product and accumulation of those that came before us. By studying the quality of their philosophy and arguments, we may come to a deeper understanding of both the rigour and fallibility of our own. This is imperative in the exploration of end-of-life care, a branch of medicine possessing hundreds of years of tradition and change.

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Community-acquired pneumonia and pneumococcal vaccination in the elderly

Charles Yin (MD/PhD 2021), Jeffrey Law (Meds 2016)

Reviewer: Dawn Bowdish, PhD (Department of Molecular Medicine, McMaster University)

ABSTRACT

Community-acquired pneumonia (CAP), most often caused by infection with the Gram-positive diplococcus *Streptococcus pneumoniae*, remains a leading cause of death in Canada amongst the elderly. With an aging population in Canada, CAP will soon be a significant challenge to the healthcare system in this country. In this article, we review the characteristics of CAP in the elderly, including its epidemiology, etiology and clinical features. We then provide an overview and history of pneumococcal vaccines and present current recommendations for *S pneumoniae* vaccination in Canada.

BACKGROUND

Pneumonia, primarily a result of colonization and infection by the Gram-positive bacterium *Streptococcus pneumoniae*, remains a dangerous disease with a high mortality rate, especially amongst the elderly.^{1,2} Each year, approximately 200 000 people in Canada contract pneumonia² and around 5000 of those will die from pneumonia or complications related to pneumonia.³

Pneumonia can generally be divided into two major categories: community-acquired pneumonia (CAP) and hospital-acquired pneumonia (HAP).⁴ Nursing homes, where a significant portion of the elderly population in Canada resides, are considered community settings in the context of community- versus hospital-acquired pneumonia.⁴ We will focus on CAP as a majority of elderly patients with pneumonia contract their illness while in a community or in nursing homes.¹⁴

EPIDEMIOLOGY OF COMMUNITY-ACQUIRED PNEUMONIA

The overall incidence of CAP in Canada is estimated to be between 5.60 and 6.11 per 1000 people.² A 2-year study at an emergency department in Edmonton, Alberta found that incidence was significantly correlated with age.² Incidence was found to increase with patient age for patients over 50, reaching a maximum of 46.39 per 1000 in patients 90 and older. Incidence was also found to be higher in men than in women in patients over the age of 70.² CAP is also the 7th leading cause of death in Canada,⁵ with an estimated mortality rate of between 0.95 and 11.7 per 1000.³

ETIOLOGY OF COMMUNITY-ACQUIRED PNEUMONIA

Microbes present in the upper airways routinely enter the lower airways. In the majority of cases, they are cleared by specific and nonspecific host defense mechanisms, but when this clearance fails to occur, pneumonia can result.¹⁴ Diverse factors that predispose individuals to developing pneumonia, and these can be broadly di-

vided into host immunocompromise, exposure to a particularly virulent respiratory microbe or inoculation with an overwhelmingly large microbial load that overwhelms the immune system.⁴

The diagnosis of CAP in the primary care setting is for the most part a clinical diagnosis, and the infectious etiology is often poorly established.⁶ In a review of the literature, it was found that a definitive microbial agent was established in only 24-67% of CAP cases.⁶⁻¹⁰ Nevertheless, most studies agree that *S pneumoniae* is the most common infectious agent responsible for CAP, being identified in 27.4 to 41.9% of CAP cases where a microbial etiology could be established.⁶⁻¹⁰

PNEUMOCOCCAL PNEUMONIA IN THE ELDERLY

Risk factors

The elderly are at increased risk of developing pneumococcal pneumonia.^{1,2} Specific risk factors that predispose the elderly to becoming colonized by *S pneumoniae* include a depressed immune system, increased prevalence of comorbidities, especially lung and cardiovascular disease, and difficulty swallowing and aspiration.¹

Clinical presentation

The clinical presentation of pneumonia in the elderly differs from the “typical” presentation of a young adult with pneumonia.¹¹ In particular, elderly patients with pneumonia tend to display fewer, or more subtle symptoms, with the authors of one study finding an average of 2.9-3.3 fewer reported symptoms in patients over 65 years of age.¹¹ In particular, there is a lower incidence of fever in elderly patients with pneumonia.¹¹ In contrast, there are some clinical comorbidities strongly associated with pneumonia in the elderly. Most significant amongst these is dementia, which is present in up to 41.1% of elderly patients with pneumonia.¹²

Management

Clinical guidelines recommend that elderly patients with pneumonia be managed differently. All elderly patients presenting with pneumonia should be assessed for clinical severity, using either the CURB-65 score (presence of confusion, BUN > 7mmol/L, respiratory rate ≥ 30, systolic blood pressure < 90 and/or diastolic blood pressure < 60, age ≥ 65)¹³ or the Pneumonia Severity Index (PSI) developed by Fine et al,¹⁴ which is a more detailed guideline to assessing severity of pneumonia.

The Canadian Thoracic Society currently does not recommend different antibiotic regimens based on age. However, its most recent guidelines specifically recommend treating nursing home residents with either a respiratory fluoroquinolone alone or with amoxicillin-clavulin and a macrolide as the first-line empiric therapy.¹³

STREPTOCOCCUS PNEUMONIAE VACCINOLOGY

Overview

Pneumococcal vaccines come in 2 general categories.^{15,16} First are the older polysaccharide vaccines, which consist of purified capsule antigens.^{15,16} These polysaccharide capsule antigens are recognized by B cell receptors, resulting in the generation of anti-capsule IgM antibodies.¹⁶ There are a number of distinct drawbacks to this strategy, including a lack of T cell antigen recognition and resultant lack of isotype switching and production of the IgA antibodies that would be needed to confer mucosal immunity against *S pneumoniae*.¹⁶

The newer generation of conjugated pneumococcal vaccines consist of capsule antigen conjugated to an immunogenic diphtheria toxoid.^{15,16} This leads to recognition by Th2 cells and the induction of isotype switching by B cells and the production of both IgA and IgG antibodies, and a stronger memory B cell response.¹⁶ In particular, production of IgG is thought to be essential in the prevention of invasive pneumococcal disease.¹⁶ Unfortunately, the conjugated vaccine currently only contains a limited number of serotypes as compared to the newest generation of polysaccharide vaccine.

History of pneumococcal vaccines

Pneumococcal pneumonia and its complications were major sources of mortality before the widespread availability of antibiotics. Mortality rates in the 1920s and 1930s from pneumococcal pneumonia and associated bacteremia and meningitis were well in excess of 70% in hospitalized patients.¹⁵

Early efforts to develop a pneumococcal vaccine began in 1914 when British immunologist Sir Almroth Wright experimented with the use of a crude whole cell vaccine in South African miners, amongst whom pneumonia was epidemic.¹⁷ By the 1930s scientists had advanced to the use of simple polysaccharide vaccines in small observational studies.¹⁵ These studies paved the way for a number of landmark controlled trials on bivalent, trivalent and tetravalent pneumococcal polysaccharide vaccines in the 1940s that showed for the first time that vaccination resulted in a drop in the incidence of pneumococcal pneumonia.^{18,19}

However, by the 1950s the attitude of the public and regulatory bodies towards pneumococcal vaccines began to change with the widespread availability of antibiotics.¹⁵ Pneumococcal vaccination was thought to be unnecessary by regulators and it wasn't until the release of a landmark 1964 study by American infectious disease specialist Robert Austrian showing continued high mortality rates amongst patients with pneumonia that interest in a pneumococcal vaccine returned.^{15,20} Austrian himself was at the forefront of *S pneumoniae* vaccinology, creating the PPSV14 pneumococcal vaccine, a polysaccharide vaccine against the 14 most common *S pneumoniae* serotypes of the time, in 1970.²¹ PPSV14 was adopted for widespread use in the United States by 1977 until 1983, when it was replaced by the PPSV23 vaccine, which expanded coverage to 23 *S pneumoniae* serotypes.¹⁵

Currently available vaccines

There are two pneumococcal vaccines currently available in the United States and Canada. The first of these is PPSV23 (Pneumovax), a polysaccharide vaccine covering 23 serotypes, produced by Merck.^{15,16} PPSV23 has been in use in the United States and Canada for several decades and a number of studies of its efficacy and safety have been published. A 2013 Cochrane review found that available evidence showed PPSV23 was effective at prevention of invasive pneumococcal disease (eg bacteremia, meningitis) but not pneumococcal pneumonia.²²

The second vaccine available is PCV13 (Prenar-13), a conjugate vaccine covering 13 serotypes, produced by Pfizer.^{15,16} Conjugated vaccines for *S pneumoniae* have been available since 2000 in the form of PCV7, an early conjugate vaccine that provided coverage of 7 *S pneumoniae* serotypes. In 2011, PCV7 was replaced by the newer PCV13,¹⁵ which was made available in the United States under the US FDA's Early Access program, reflecting the changing paradigm of the pneumococcal vaccine from being thought of as unnecessary by regulators to now being recognized as essential in the reduction of pneumonia-related mortality. A large-scale clinical trial in nearly 85 000 patients (the CAPiTA study) sponsored by Pfizer showed that PCV13 was 70% effective at the prevention of invasive pneumococcal disease and 46% effective at the prevention of pneumococcal pneumonia.²³

CURRENT RECOMMENDATIONS ON S PNEUMONIAE VACCINATION IN THE ELDERLY

Current recommendations on vaccination of the elderly against *S pneumoniae* are based on those released by the US Advisory Committee on Immunization Practices (ACIP).^{24,25} For individuals 65 or older, the ACIP has recommended the administration of a single dose of PCV13 followed by a single dose of PPSV23 after 6-12 months.²⁴ There is currently no evidence to suggest that revaccination with PPSV23 provides additional benefits.²⁵

CONCLUSION

Pneumococcal pneumonia continues to be a major source of mortality for the elderly. The development of a vaccination program against *S pneumoniae* has been a major step forward in the efforts to mitigate the impact of pneumonia on the health of the elderly.

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The implantable miniature telescope

Envisioning a treatment for end-stage age-related macular degeneration

Phillip Williams (Meds 2017), Steven Wong (Meds 2018)

Faculty Reviewer: Dr Alex Mao, MD, OD, MPH (Department of Ophthalmology)

ABSTRACT

Bilateral, end-stage, age-related macular degeneration (AMD) is a devastating condition of the eye. As the leading cause of blindness worldwide in the elderly, it leads to poor quality of life. While antivascular endothelium growth factor agents are used as front-line treatment for wet AMD, no current treatment exists for bilateral, end-stage AMD in Canada. The implantable miniature telescope (IMT), approved by the Food and Drug Administration in 2010, is a treatment option available for those over the age of 65 in the United States with stable severe to profound vision impairment (best-corrected visual acuity 20/160 to 20/800) caused by bilateral central scotomas associated with bilateral, end-stage AMD. Combining the fields of engineering and ophthalmology, intraocular implantation of the IMT provides improvements in patients' functional vision and quality of life. As a relatively new treatment targeting the elderly, there are strict inclusion criteria as well as risks associated with the procedure. However, research and continuing development in this field is ongoing to minimize these risks.

AGE-RELATED MACULAR DEGENERATION

Aging gracefully is a common goal amongst the elderly. Seniors over the age of 65 capable of performing activities of daily living (ADLs) such as walking and eating, as well as complex instrumental ADLs (IADLs), including driving and completing housework, report having a better quality of life, less morbidity, and less mortality.^{1,2} Vision plays arguably one of the most important roles in carrying out ADLs and IADLs, but unfortunately vision impairments are highly prevalent in the elderly population.² Bilateral, end-stage, age-related macular degeneration (AMD) is one of the most debilitating ocular conditions that can dramatically impair the quality of life in seniors.³ It is a degenerative disease of the macula resulting in a loss of central vision, and central scotomas.⁴ As the leading cause of central vision loss worldwide for the elderly, ahead of cataracts, glaucoma, and diabetic retinopathy, AMD affects 0.9, 4.6, and 13.1 percent of people aged 65 to 74, 75 to 84, and >84, respectively.⁵ There are two types of AMD: dry AMD, which is characterized by the accumulation of yellow deposits in the macula called drusen, and wet/neovascular AMD, which can arise from dry AMD, and is characterized by damage to the macula due to neovascularization.^{3,4} While genetics may influence the development of wet AMD, current hypotheses highlight the involvement of the pro-angiogenic

molecule vascular endothelial growth factor (VEGF) in this condition.^{3,6} Both dry and wet AMD can progress to end-stage AMD, which presents with bilateral, irreversible macular scars and/or large areas of degeneration of retinal pigment epithelium, which leads to profound vision loss, increased morbidity and a decreased quality of life.⁷

CURRENT TREATMENTS

Several treatment modalities are available for the management of AMD. Ranibizumab and bevacizumab are 2 Food and Drug Administration (FDA)-approved, anti-VEGF based agents used for the treatment of wet AMD.⁸ Ranibizumab is administered monthly by intravitreal injection, and demonstrates an acceptable safety profile.⁹ Ranibizumab has been shown to halt the progression of wet AMD and improve visual acuity by 3 lines on the Early Treatment Diabetic Retinopathy Study (ETDRS) scale in 30-40% of patients.¹⁰ However, anti-VEGF agents are ineffective for bilateral, end-stage AMD.¹⁰⁻¹² An optical option to manage visual impairment is the usage of handheld Galilean or Keplerian telescopes. These handheld extraocular devices are cumbersome and have a restricted field of view, as vision depends more on head and hand movements than on natural eye movements.¹¹ Currently, there is no approved treatment for bilateral, end-stage AMD in Canada.

IMPLANTABLE MINIATURE TELESCOPES

The implantable miniature telescope (IMT), approved by the United States FDA in 2010 for individuals over the age of 65, is a treatment for bilateral, end-stage AMD that circumvents the problems associated with extraocular visual aids.¹¹ This intraocular prosthetic is about the size of a pea (3.6 mm diameter, 4.4 mm length). It contains wide-angle micro-optical lenses in a Galilean telescope design, which when combined with the cornea of the eye, acts as a compound telescope. This effect causes retinal image enlargement of approximately 2.2 or 2.7 times, enabling an individual to be able to distinguish more detail from the visual field.¹³ The prosthetic is surgically placed monocularly into the capsular bag after removal of the eye's lens, protruding 0.1 to 0.5 mm from the pupillary plane.¹⁴ The IMT provides central vision to the eye by providing magnification and redirecting light onto the healthy perimacular areas of the retina. Coordinated use of the implanted eye for central vision and the fellow, non-operated eye for peripheral vision improves eyesight for patients with bilateral end-stage AMD, allowing them the possibility of participating in both stationary and dynamic activities. After the operation, patients are administered prednisolone acetate eyedrops for up to 3 months, along with a standardized

course of antibiotics to facilitate recovery.¹⁴ Additionally, patients must agree to participate in postoperative visual training with a low vision specialist and occupational therapist to maximize their ability to perform daily activities. The rehabilitation, typically lasting 6 months to a year, involves training patients to perform tasks at different distances and improving hand-eye coordination in both stationary and dynamic postures. While this process is challenging, motivated patients with good psychosocial health and realistic goals are able to gain quality of life.

The IMT is well studied, and is the only FDA-approved telescopic prosthetic for the treatment of end-stage AMD.¹¹ One year postimplantation, the IMT provides a 3-line or more improvement in both distance and near best-corrected visual acuity in 53% of patients, whereas the untreated fellow/contralateral eye showed improvements in 10% of patients.¹³ Using patient data over a period of 12 years, Brown et al showed that IMT implantation in patients with bilateral, end-stage AMD resulted in a higher quality of life gain compared to controls (fellow/contralateral eye which underwent cataract surgery), along with a cost-utility of \$19 000 USD/QALY (<\$50 000 USD/QALY is considered to be very cost effective).¹⁵

LIMITATIONS

While the IMT can restore vision to some extent in patients with bilateral end-stage AMD, it cannot prevent the macula from further deterioration and is not considered a curative treatment.¹⁶ Thus, the IMT is not indicated for patients with active choroidal neovascular membranes.¹⁶ Another limitation of the IMT is that the surgical procedure to implant the IMT demands immense technical expertise, and therefore carries surgical risk. There has been a documented 20% decline in corneal health 3 months postoperatively, though damage to the cornea after this period is minimal.¹⁷ Nevertheless, excessive damage to the corneal endothelium may necessitate a corneal transplant.¹⁷ Due to the risks of performing this procedure, the IMT is contraindicated in individuals with prior intraocular or cornea surgery, low baseline corneal endothelium cell density, and/or other pathologic conditions affecting the retina.¹⁶ The surgical technique used to implant the IMT, along with the prosthetic itself, have undergone revisions to minimize the damage that occurs to the corneal endothelium. A recent 2013 study showed that the “next generation” telescopic prosthesis required smaller incisions to the eye than the current prosthetic, and that the resultant improvements in surgical technique led to less corneal endothelial damage.¹⁸ With regards to postsurgical events, the IMT is contraindicated in patients with cognitive impairment, as this may limit their ability to engage in the postoperative rehabilitation that patients receiving the prosthetic are required to attend.^{13,16} In addition to the rehabilitation process, patients with an IMT will still require glasses for further vision correction.¹⁶

SUMMARY

Bilateral, end-stage AMD is primarily a disease of the elderly. It results in both profound and irreversible visual impairment that can limit one’s ability to engage in activities of daily living. The IMT is a prosthetic approved by the FDA in the United States for certain patients over the age of 65 with this condition. Implanted into the anterior compartment of the eye, the IMT provides an intricate means of improving visual acuity and quality of life for those with bilateral, end-stage AMD. Ongoing refinement to both the surgical technique and the IMT itself will address concerns over the risk of performing the implantation. While the IMT is not a cure, it is an improvement on the existing, handheld, extraocular devices used to manage end-stage AMD and offers some hope to people living with this debilitating condition.

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The nature of geriatrics

Interview with Dr Michael Borrie

Ramona Neferu (Meds 2018), Han Yan (Meds 2017)

Faculty Reviewer: Dr Michael Borrie, BSc, MB ChB, FRCPC (Division of Geriatric Medicine)

Dr Michael Borrie is the Program Director of the South Western Ontario Regional Geriatric Program and past Chair of the Division of Geriatric Medicine. Trained in New Zealand and Canada, Dr Borrie shared with us his experiences from 30 years of practice in geriatric medicine and his current roles as a clinician, researcher, administrator, and teacher.

UWOMJ: Tell us a little about yourself.

Michael Borrie: I did a degree in biochemistry before entering the 5-year medical school training in New Zealand. After medical school, we do 2 years as a “house surgeon”, after which we could practice family medicine. I wished to pursue internal medicine and trained in Edmonton, Alberta and then London, Ontario to specialize in geriatric medicine. I met my spouse, Nancy, in my 4th year in London. We moved to Dunedin, New Zealand where I did 2 years as a research fellow and where we had the first of our three daughters. We returned to London in 1985. It was very busy doing mainly clinical service on a 40-bed geriatric rehab unit and I was also one of the attending physicians on general internal medicine, doing 1-in-3 call.

What is special about geriatrics?

I enjoyed internal medicine. Yet, during the subspecialty rotations, I was looking at the patient through the lens of a single organ system. After stabilizing a heart failure for an elderly patient, we were then asked about their arthritis, which we never had the opportunity to address. This was not my idea of patient-centred medicine and not fully satisfying. This confirmed that I wanted to manage older people, multi-system disease and the related complexities, and the field of geriatric medicine was clearly for me.

Geriatric medicine is special because you can analyze an event such as a fall and split out the multiple factors. Often, 6 or more different factors combine to cause a person to eventually fall. That is the nature of geriatrics. You have a single syndrome: falls, confusion, incontinence or polypharmacy. You can dissect it out and ask “what are all the reversible and irreversible factors” and then focus on the reversible elements.

What do you like most about being a geriatrician?

It’s a very satisfying career. Older patients are very appreciative of what you do and they’re very respectful. They don’t always follow advice but that’s no different than other patients. I can’t change the world but I can do multiple small things for their many complex diseases to make a difference to their quality of life and, ultimately, this is what medicine comes down to—improving the quality of someone’s life.

Geriatric medicine deals with multiple chronic diseases and their complex interaction. I enjoy the intellectual stimulation of understanding a person’s history, as well as the clinical examination and investigations. I have the luxury of time for a full history, examination, and comprehensive counselling that may make a difference.

Research has always interested me. There are many research opportunities in geriatric medicine from the basic science of individual diseases, to clinical trials of novel compounds, to knowledge translation that changes patterns of clinical practice and mindful clinical care.

Our division is one of the largest and well-integrated divisions across the country. We can support some of us to lead as clinical educators or clinician-scientists and everything in between. Each of the geriatricians pursues his or her individual strengths and works together with allied health professional teams to exemplify best practices, care, and education for older adults in our region.

What are your current responsibilities?

I do approximately equal amounts of research, administrative work, and clinical work, as well as clinical teaching in the outpatient clinic or on the geriatric rehabilitation unit.

In 1985, I began my career as a geriatrician and by 1995, became the chair of the division. I was one of 4 geriatricians and over the next 15 years took on the leadership and administrative role of the division. We recruited geriatricians and built the division to 11 members. As an academic geriatrician, you can develop as a clinician, researcher or clinician-teacher, although it should be noted that it is difficult to do both clinic work and research.

Through my training, interests and opportunities in Canada, I have evolved as a clinician-researcher. My research focus was initially on Alzheimer disease and also on urinary incontinence. In the early 1990s, we began new trials in Alzheimer disease and offered participation in these clinical trials to patients seen in the Aging Brain and Memory Clinic. Over the last 10 years, the focus has been on treatments for the amyloid hypothesis and disease modification. The trials are more complex lasting several years and require positron emission tomography imaging for amyloid.

Can you outline the 2+1 Care of the Elderly option vs 5-year training in Geriatric Medicine?

Family physicians with an extra year in Care of the Elderly can be very effective physicians in geriatric care. The longer they practice in geriatric care, the more the distinction between their clinical practice and that of a geriatrician narrows.

Care of the Elderly-trained physicians who pursue an academic career are more likely to have an academic role as educators rather than researchers, unless they have additional research training. In community practice they may be the physician lead providing consultation or direct management for the elderly patients within a family health team. They may pursue the Care of the Elderly training to develop additional skills for the management of elderly patients within their practice.

As you complete your medical degree, if you are unsure if you want a career in family medicine with geriatrics as a focus or a career in geriatric medicine, entering an internal medicine program is always a good idea. It is easier to switch into family medicine from internal medicine than the reverse, and you will be a better physician for having done additional training in internal medicine.

In Ontario, of the 130 geriatricians who have completed the subspecialty 5-year training in geriatric medicine, half are in academic centres and half are in community settings.

What are the opportunities and challenges in the future for geriatrics?

My bias is towards the opportunity to prevent, manage and treat cognitive impairment. Cognitive impairment is the one condition that threatens a person's independence. Right now the direct and indirect costs due to cognitive impairment/dementia are about \$10 billion a year. By 2038, the costs are estimated to be \$150 billion per year. The biggest driver of direct costs is people with cognitive impairment staying in acute care beds and eventually having to live in long term care institutions. We could do so much more to prevent cognitive decline and its progression.

Historically, acute care hospitals were built to treat acute illnesses. We can do much better at preventing delirium following surgery or medical interventions. There is an irreversible component of delirium and patients will deteriorate during an acute care admission. This will result in longer hospital stay and drive up our health care costs.

The challenge to future physicians will be developing smarter models of care. Technology will affect health care and you will have very tech-savvy elderly patients in your practice. For example, as a consultant, communication will include e-consults and there will need to be different funding models to support this.

What are your hobbies or personal interests?

My wife and I love to regularly do social and Latin dancing. We've been doing this since 2005. It's good for our brain and our relationship. I've always enjoyed swimming—in high school as a competitive swimmer—and now recreationally whenever I have the opportunity.

Any advice for medical students interested in geriatrics?

Take advantage of any opportunities for clinical rotations and exposure to geriatric medicine during your training. Get research experience in geriatrics, such as the summer research training program.

Do you have any thoughts about the recent ruling in favour of legalizing physician-assisted suicide (PAS)?

In 30 years of practice, I cannot think of a patient encounter where I've said that the only option at this point is assisted suicide. That may mean that people who would benefit from PAS have never come to a geriatrician. There may well be a few people for whom assisted suicide might be the only option. However, I think one has to be cautious about assisted suicide and the potential for a slippery slope. If it is thought through very carefully and there are appropriate policies and safeguards in place, there may be some people who could benefit. Most people with severe pain are managed appropriately and assisted suicide does not have to be considered. As a society, we need to protect people who are vulnerable, particularly older individuals with disabilities or cognitive impairment, so that they don't feel they have to "move on" and do the honourable thing. Fortunately for me, in geriatric medicine, I have never felt the need to consider this option. I work with teams and when appropriate we aim to provide the best end-of-life care.

Anticholinergic toxicity, polypharmacy, and inappropriate prescribing

Nicole Arseneau (Meds 2018), Kevin Braden (Meds 2017)

Faculty Reviewer: Dr Jennie L Wells, BSc, MSc, MD, FRCPC, FACP (Division of Geriatric Medicine)

An 84-year-old woman, Doris, is brought to the ER by her daughter just after 2300 on a Tuesday night, complaining of a racing heart beat and palpitations. She is agitated and very uncooperative. Her daughter is worried about how strange Doris is acting. She mentions that the patient had an myocardial infarction (MI) 5 years ago, is diabetic, and takes a number of medications before bed at about 2130.

Adults over the age of 65, like Doris, are more likely to visit an emergency department than younger individuals.^{1,2} In addition, older adults tend to have more comorbidities, take more medications (polypharmacy), have higher rates of dementia and other neuropsychiatric disorders, and may present with unconventional and nonspecific symptoms.²⁻⁵ Unsurprisingly, physicians without specialized geriatric training report feeling less confident when treating older patients in the emergency department compared to younger patients.²

Doris is becoming increasingly agitated and confused. On examination, her skin appears erythematous, hot, and dry to the touch. Her oral temperature is 37.8°C. She has slight bilateral mydriasis. Her respiratory rate is slightly rapid at 20 breaths per minute, her oxygen saturation is 99%, and there is no obstruction of her airway. With some effort, an electrocardiogram is obtained showing sinus tachycardia at 116 beats per minute and her blood pressure is slightly elevated at 140/85 mmHg. A fingerstick glucose test shows that her blood glucose is 5.8 mmol/L, within normal limits.

ANTICHOLINERGIC TOXICITY

Doris' attending physician suspects that she is suffering from anticholinergic toxicity due to her classic constellation of symptoms. An anticholinergic toxidrome may present when a medication or poison antagonizes muscarinic receptors throughout the body causing a variety of potentially dangerous effects, often remembered by the mnemonic "hot as a hare (hyperthermia), dry as a bone (anhidrosis), red as a beet (vasodilation), blind as a bat (mydriasis), mad as a hatter (delirium and hallucinations), and full as a flask (urinary retention)."⁶ Anticholinergic effects are more prevalent in the elderly population, in part due to age-related pharmacokinetic and pharmacodynamic changes.⁷⁻⁹ Specifically, changes in body composition, including a higher percentage of fat, can increase a drug's volume of distribution and impair elimination of certain drugs, including anticholinergics. Furthermore, a drug's half-life may be significantly prolonged in elderly patients due to liver or kidney impairment.¹⁰ As such, the American Geriatrics Society recommends that most anticholinergic medications should be avoided in older adults.⁸ Anticholinergic toxicity may result from

intentional or unintentional poisoning, overdose, and medical oversight.^{6,8,12} In Doris' case, it is likely that one or more of her medications is causing this acute reaction, though which drug remains unknown.

Doris is moved into an isolated psychiatric care room in the emergency department with her daughter, and her agitation lessens thereafter. Her symptoms do not appear to be life threatening, and have not worsened since her admission. Complete blood count, electrolytes, and arterial blood gases are normal. She continues to be monitored closely.

Treatment of a patient with anticholinergic toxicity varies based on symptoms, time since the exposure, route of administration, patient delirium and aggression, as well as other patient factors. Many cases, such as Doris', can be treated supportively. Activated charcoal can be given to decontaminate the gastric compartment if the suspected agent was given orally. It is most effective if the instigating drug is known to bind to charcoal and was ingested within the last hour. In Doris' case, the drug is unknown and ingestion was most likely over an hour ago. The physician also does not want to interfere with the absorption of her other medications. Physostigmine can be given as an antidote to certain anticholinergic agents in the event of a poisoning; however, it has a number of potential adverse reactions including seizures, bradycardia, heart block, and bronchospasm.¹³⁻¹⁵ Doris' physician is hesitant to start any potentially dangerous treatments when her condition appears to have stabilized.

PRESCRIBING CASCADE

Doris remains overnight in the emergency department for observation. In the morning, her vitals have partially normalized and she is no longer agitated. She is able to give a complete history, which is significant for an MI 5 years ago, hypertension, seasonal depression, type II diabetes mellitus, and osteoporosis. She is currently taking 13 daily medications for these conditions: propranolol, captopril, low dose ASA, hydrochlorothiazide, metoclopramide, fluoxetine, amitriptyline, rosuvastatin, metformin, naproxen, ranitidine, alendronate, and a calcium/vitamin D supplement. She has also been taking an over the counter (OTC) cold remedy for a persistent cough. She often feels tired during the day and drinks plenty of coffee to stay awake. Recently she has had some trouble falling asleep. On her daughter's advice, she took two diphenhydramine tablets as a sleep aid.

Doris' list of medications is concerning both for its contents as well as its length. Many of her medications are clearly aimed at managing her current conditions; for example, alendronate and her

calcium/vitamin D supplement are most likely related to her osteoporosis. However, it is possible that some of her medications are simply treating side effects of other medications. This is referred to as a prescribing cascade. Prescribing cascades are common in the elderly population, particularly when the patient is not educated about the potential side effects of a new medication. For example, a persistent cough that Doris is treating with an OTC cold remedy is a common side effect of acetylcholinesterase (ACE) inhibitors such as captopril. Another well known prescribing cascade is the use of metoclopramide to treat nausea associated with any number of drugs.^{5,16} Furthermore, Doris' fatigue may be due to her cardiac medications (most likely propranolol), which may influence her coffee consumption, which in turn could have necessitated her use of diphenhydramine as a sleep aid. The combination of diphenhydramine, an anticholinergic sedating H₁ antihistamine, with an OTC cold remedy (likely containing other anticholinergic medications, such as chlorpheniramine and dextromethorphan) is the most likely cause for her hospitalization.^{8,10,13} It is recommended that diphenhydramine use be restricted in all patients of advanced age, except for treatment of severe acute allergic reactions.⁸ While diphenhydramine administration appears to be the precipitating factor for Doris' condition, some of her other medications also have anticholinergic effects, notably amitriptyline and ranitidine.^{8,11-13}

Once Doris' symptoms have resolved, she is discharged home with the recommendation that she follow up with her family doctor. She is instructed not to take any more diphenhydramine or OTC cold remedy.

POLYPHARMACY AND INAPPROPRIATE PRESCRIBING

Doris' case highlights the dangers of polypharmacy, often defined as using more than 5 drugs routinely.^{9,12,17} Polypharmacy is increasingly prevalent in the elderly population, with more than 25% of Canadian adults over the age of 65 taking more than 5 medications daily.⁹ Polypharmacy is believed to be due, at least in part, to more comorbidities in this age range as well as prescribing cascades, as described above.^{2,9,12,16} People taking more medications, especially the elderly, are at increased risk for adverse drug reactions, which are a significant cause of hospitalization, morbidity, and mortality.^{9,10,18} Up to 25% of older adults report experiencing an adverse drug event within the past year, some requiring hospitalization.^{9,18} Notably, many older adults are taking OTC, herbal, and dietary preparations in addition to prescription medications, which may contribute to drug interactions and side effects,⁵ as in Doris' case. Nevertheless, polypharmacy itself is not necessarily harmful. Patients may be on several medications, all of which are appropriate for their conditions.^{11,12} What is more concerning in this population is the higher potential for inappropriate prescribing, most likely due to the complexity of medication use.¹² There are several tools available to physicians to evaluate the appropriateness of a medication in the elderly population, including the Beers Criteria and STOPP Criteria.^{8,11,12} However, even with these tools in place, up to 40% of nursing home residents in one study were prescribed at least one inappropriate medication.^{12,17}

Doris' family physician notes that several of Doris' medications are being used appropriately to treat her conditions, but there are

some improvements to be made. The physician suggests replacing captopril, an ACE inhibitor, with an angiotensin II receptor blocker such as losartan. This may relieve Doris' cough while still reducing her blood pressure. In addition, switching from thrice-daily captopril to once-daily losartan may be beneficial as dosing frequency is inversely related to medication compliance.¹⁹ The physician also suggests that naproxen be replaced with acetaminophen for pain control to reduce the risk of salt retention, hypertension, and GI bleeds.^{8,11} It is recommended that Doris' depression be managed by citalopram instead of her current antidepressants, as amitriptyline is an anticholinergic agent, and fluoxetine is associated with both anorexia and numerous cytochrome P450 interactions.^{6,8} Finally, it is recommended that both ranitidine and metoclopramide be discontinued, as both have anticholinergic properties, and metoclopramide in particular is known to precipitate extrapyramidal and parkinsonian symptoms in the elderly. These reductions and changes in Doris' medications should reduce her overall anticholinergic burden as well as her risk for adverse drug events and interactions.

Polypharmacy, inappropriate prescribing, and adverse drug reactions are an exceedingly common yet preventable source of illness, hospitalization, morbidity, and mortality in the elderly population, yet these undesirable outcomes are also preventable in many cases.^{9,18} It is vitally important for physicians to be mindful of these issues. Physicians should review the indications and contraindications for all medications as well as educate their patients on side effects of both OTC and prescription medications.

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THINKING ON YOUR FEET

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Rare cancer, common conversation

A case of T-cell prolymphocytic leukemia with end-of-life discussions

Craig Olmstead (Meds 2017), Charles Jian (Meds 2018)

Faculty Reviewer: Dr Cyrus Hsia, MD, FRCPC (Division of Hematology)

INTRODUCTION

Cancer in its many forms is particularly common in elderly populations. For females over the age of 80 in Canada, approximately 2% will have a new diagnosis of cancer each year.¹ With thousands of types and subtypes, cancer is a heterogeneous spectrum of diseases, each with its own difficulties in establishing a diagnosis and an effective management strategy.

The diagnosis and treatment of cancer in the elderly is fraught with additional challenges. Symptoms in the elderly may be atypical or less pronounced compared to younger patients. Seniors often have multiple pre-existing conditions and comorbidities in addition to their presenting complaint. Most geriatric patients take numerous medications, complicating a straightforward diagnosis and confounding a simple treatment plan.²⁻⁴ Cognitive impairment, whether due to pathology or physiological decline, can be a complicating factor, hampering physician-patient interactions.² Even good clinicians can still struggle with the complexities of common malignancies in an elderly patient due to these additional factors. Rarer malignancies can be that much more challenging.

Here, we present a case of a patient diagnosed with an exceptionally rare hematologic cancer in combination to other comorbidities, and explore how the health care team and the family was able to collaborate to develop a treatment plan acceptable to both parties.

INITIAL PRESENTATION AND DIAGNOSIS

The patient, CB, was an 83-year-old female retired hairdresser who presented with her daughter to her primary care provider with a 1-2 month history of left upper quadrant pain. Initially, CB's pain was ill-defined, intermittent, and did not limit her activities, but worsened significantly over the few days before the visit.⁵

On presentation, CB was holding her left side and grimacing in pain. CB had an extensive past medical history headlined by mild vascular dementia and heart block requiring a pacemaker. She also had a history of hypertension, hyperlipidemia, bilateral carotid stenosis, and scoliosis. CB's medications included aspirin 81 mg daily, metoprolol 100 mg twice daily, verapamil 240 mg daily, donepezil 10 mg daily, ezetimibe 10 mg daily, fluvastatin XL 80 mg daily, and memantine 10 mg twice daily. CB's adult children who lived nearby provided assistance with medications and meals during daily visits, resulting in good compliance to her prescriptions and reasonable nutrition status. CB also retained many of her activities of daily living despite her conditions; she dressed, bathed, toileted, and ambulated without assistance. CB was a nonsmoker and consumed 3-4 beers per day. Despite her dementia CB had some ability to make decisions regarding her life and health, relying on her daughter more in an advisory capacity on matters needing clarification.⁵

On physical examination CB did not appear ill. However, the exam revealed positive bilateral lymphadenopathy in the neck, axilla, and inguinal regions. Fine inspiratory crackles were noted in the left lower base of the lung. Tender splenomegaly, palpable down to the left lower quadrant, was also found. No hepatomegaly was noted.⁵

After being admitted to hospital, computed tomography revealed an enlarged spleen occupying two-thirds of the left abdominal cavity, a small pleural effusion at the left lung base, and enlarged lymph nodes along the gastro-hepatic ligament, the porta hepatis, the mesentery, and both groins. Complete blood count was remarkable for a white blood cell count exceeding 70 000 with atypical lymphocytes and 20% blasts. Platelets were low at 60 000. A referral to hematology/oncology was made to investigate possible lymphoma or leukemia. Peripheral smears revealed lymphocytes with nuclear contour irregularities, cytoplasmic border irregularities, and rare nuclear clefts. Prominent nucleoli were lacking in most cells. Bone marrow biopsy revealed significantly increased hypercellularity consisting primarily of small lymphocytes. Flow cytometry detected aberrant CD4+/CD8- T-cells and was positive for clonal rearrangement of the TCR- β gene, suggesting T-cell leukemia. CB was negative for human T-cell lymphotropic virus-1, ruling out adult T-cell lymphocytic leukemia. A final diagnosis of T-cell prolymphocytic leukemia (T-PLL) was made.⁵

T-CELL PROLYMPHOCYTIC LEUKEMIA

T-PLL is a rare malignancy, typically affecting those 65 or older, with males somewhat more affected than females. Previously described as a variant of chronic lymphocytic leukemia (CLL), it represents less than 1% of all mature lymphocytic leukemia diagnoses.^{5,6} While most forms of PLL are malignancies of B-cells, T-PLL is a malignancy of mature T-cells. It is a particularly aggressive form of lymphocytic leukemia, with reported median survival times after diagnosis counted in months.⁷

As T-PLL is quite rare, diagnosis can be difficult. A key feature of T-PLL is dramatic splenomegaly, palpable 10 cm below the left costal margin in over 80% of patients. Other potential symptoms include hepatomegaly, ascites, lymphadenopathy, lymphocytosis, pleural effusions, skin lesions, and CNS involvement.⁶ Further testing typically involves peripheral smears and bone marrow biopsies. Immunophenotype features of T-PLL include the presence of CD52 as well as T-cell markers CD2, CD3, and CD7.⁷ Genetic features include clonal rearrangement of TCR genes.⁸

Typical cancer treatments such as splenectomy, splenic irradiation, leukaphoresis, or standard chemotherapy are largely ineffective. The primary therapy is a monoclonal antibody called alemtuzumab, which targets CD52 and was created to treat B-cell CLL

resistant to standard chemotherapy. CD52 targeting causes cancer cell lysis by apoptosis through a host effector mechanism. Trials have shown remission rates of up to 30 months in patients with T-PLL, and several further studies found a median survival time of 14.8 months with treatment. Hematopoietic stem cell transplantation is an option for those who achieve complete remission with alemtuzumab. Alemtuzumab is associated with serious toxicities, particularly myelosuppression. Potential adverse effects include severe infections, bleeding crises, and hypersensitivity reactions. Regrettably, in all cases the cancer eventually relapses.^{7,9,10}

TREATMENT AND FOLLOW-UP

The health care team engaged in a detailed discussion with CB and her family regarding beliefs, quality of life, and the options available for palliative and curative treatment. Given CB's advanced age and multiple comorbidities, the likelihood of a negative outcome from toxicities or side effects was significant. Officially, CB's daughter was the surrogate decision maker. However, she wanted CB to be given the opportunity to choose her own treatment, despite the possibility that she may not be fully aware of the risks and benefits of treatment. Ultimately, CB opted for chemotherapy with alemtuzumab, stating that she "just wasn't ready to die yet." A modified treatment regimen with subcutaneous injections and a slow introduction of alemtuzumab was initiated to minimize the potential for side effects.⁵

Cost was another challenge faced by the health care team. A 12-week course of alemtuzumab costs over \$240 000. The oncologist and CB's daughter collaborated closely to find outside sources of funding to help cover this cost. An infusion center was found several days later, and chemotherapy was initiated in a timely manner.⁵

CB tolerated the treatment well, with few side effects. After 6 weeks of therapy there was a significant reduction in splenomegaly and lymphadenopathy, with the white blood cell (WBC) count returning to 2.2, and platelets returning to 176 000. Following the 12-week treatment CB was discharged on antibiotics as a result of T-cell obliteration and followed monthly. At two months post-treatment, she was still asymptomatic, with a WBC count of 6.7 and platelets at 143 000. At three months post-treatment her T-cell counts returned to 200 000 and antibiotic therapy was discontinued.⁵

CB continued to live in her own home post-therapy. She celebrated her 84th birthday with family and friends, and was able to travel to her hometown to visit her remaining family members. However, 4 months post-therapy she began to develop recurring left upper quadrant pain and splenomegaly. Palliative radiation therapy was offered. CB's daughter, after discussion with the rest of the family, refused radiation therapy and other treatment options on grounds that it would not bring CB an acceptable quality of life. CB was kept in her home with hospice care for pain management and end-of-life care. Despite her deteriorating condition, she remained mobile and active until 3 days prior to entering a comatose state. She died shortly thereafter with her family at her bedside.⁵

DISCUSSION

The medical side of this case involves an exceedingly rare, but notably aggressive form of leukemia. Establishing a diagnosis of T-PLL can be troublesome given its rarity and its nonspecific symptoms on presentation. Treatment is frequently minimally effective, with the main prognostic factor being response to alemtuzumab.⁷ As T-PLL is primarily a disease of the elderly, both diagnosis and treatment can be challenging. In this case, dementia proved to be the main hurdle, as concerns of comprehension by CB were noted by the involved clinicians.⁵ Nevertheless, physicians should be aware of this rather unique form of hematologic malignancy, mindful of its defining features on physical exam and be prepared to make appropriate referrals to hematology/oncology when suspicion of T-PLL is high.⁷

However, at its core this case is worth highlighting for the manner in which end-of-life discussions occurred. In an aging society, the strategies for addressing terminal illness in the context of cognitive decline become increasingly important.^{2,4} This case underlines the necessity of including all key stakeholders in the conversation about treatment options, including clinicians, patients, and family members.^{2,5} Not every malady is curable, but all patients can feel cared for by their medical team.

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