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Fold twice in each direction before tearing.

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See page 31 for an update from the Lancaster Medical Heritage Museum.

FROM THE EDITOR'S DESK

Why Don't We Follow Evidence-Based Guidelines?

Corey D. Fogleman, MD, FAAFP
Editor in Chief

In this issue of *JLGH,* we are pleased to highlight provocative work being done at LG Health, including a report from Meredith Clark and her Pharmacy Services colleagues. They present results of a review they performed on the charts of patients who have both diabetes and some form of cardiovascular disease. Notably, more than 25% of these charts had no evidence that patients had received a prescription for SGLT-2 inhibitors or GLP-RAs, medications recommended by the American Diabetes Association.

Certainly, this is not a problem unique to Lancaster. In a systematic review of 54 studies, most patient-practitioner dyads needed more than a year to accelerate therapy when labs confirmed that patients were not at therapeutic goal regarding their diabetes.[1] What is notable in Clark's report is that the local study documented non-adherence over more than three years.

The concept of clinical inertia — the failure to accelerate or otherwise change therapy to meet the standard of care — was first described in the literature more than 20 years ago,[2] and we have all certainly taken note of this occurrence at times in a patient chart. But now with the use of the electronic medical record and chart mining, we can readily detect this propensity at scale. Add in big data, and we're faced with big questions, notably: Why don't we, as partners in the health care experience, follow guidance?

Clinical inertia is the result of factors at the level of the clinician, the patient, and the clinic in general. At the clinician level, there may be lack of awareness or know-how, lack of understanding regarding need, or confusion regarding conflicting suggestions. We all have competing demands, but certainly most have a bias toward "doing no harm."

At the patient level, there may also be a lack of insight, a comfort regarding current plan-of-action or goals, and an emotional overlay we might broadly call fear. Yet there is some evidence that health care professionals inappropriately lay blame; patient frustrations with the health care labyrinth are not necessarily representative of a lack of interest in change.[3]

Finally, the system may be part of the challenge, for example if the clinical care team isn't helping to facilitate change, if there are medicine supply shortages or insurance barriers, among other possibilities. As clinicians we may all feel we lack the tools to build the plane we're flying.

Of course, process evaluations — like the one presented by Clark and her colleagues — must eventually be translated into formative interventions so that the promise of health system learning processes can be realized. An intervention need not be complex; studies of clinical inertia in hyperlipidemia suggest that patients who know their targets are more likely to achieve their goals.[4]

So, how can we reduce the risk for clinical inertia? Working closely with those who question the status quo — like students and residents — and conducting projects and making presentations — like doing studies and publishing articles — will bring us closer to not only practice guidelines, but how we may better serve our patients. Studies also demonstrate that targeted guidance and ongoing peer review help physicians better follow standards.[5,6]

We at LG Health are fortunate to have unique resources available, from the Research Institute and Business Intelligence partners, to the Center for Healthcare Innovation, all of which can help us with implementation science. Thus, structural change is within reach.

Clinical inertia may be putting patients at risk, but our own medical education represents a continuous opportunity. I hope what you find in these pages can help inspire better care.

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Clark


Khan


Dooley-Wood


Moore

Clinical Inertia

A Retrospective Review of Medication Treatment Plans in Patients with Type 2 Diabetes and Cardiovascular Disease

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INTRODUCTION

The incidence of Type 2 diabetes mellitus (T2DM) has remained steady at about 6% while the age-adjusted prevalence of total diabetes among adults aged 18 years or older has increased steadily to more than 13% over the past 20 years.[1] The management of diabetes and its complications is responsible for significant health care costs every year.[1,2] The macrovascular complications of uncontrolled diabetes, such as atherosclerotic cardiovascular disease (ASCVD), are a focal point of pharmacotherapy selection and intensification.[2]

Patients with diabetes are at an increased risk of experiencing major adverse cardiovascular events, such as myocardial infarction and stroke. Therefore, antihyperglycemic medication classes with proven cardiovascular benefit, such as sodium-glucose cotransporter-2 (SGLT2) inhibitors and glucagon-like peptide-1 receptor agonists (GLP-1 RA), should be prioritized. The American Diabetes Association (ADA) recommends these agents be utilized in patients with ASCVD or at high risk of ASCVD regardless of their A1C due to proven cardiovascular risk reduction.[2] Patients may require multiple antihyperglycemic medications to effectively lower blood glucose levels and to achieve their goal A1C; however, many patients remain on suboptimal medication regimens.

Clinical inertia, or the lack of appropriate treatment alteration or escalation to evidence-based regimens despite risk factors or not achieving treatment goals, can be a common and detrimental problem with chronic disease state management.[3] A cohort study of U.S. patients demonstrated that from 2015 to 2019, SGLT2 inhibitor use had increased overall, yet utilization was still not optimized among patients who would benefit from this class of medications.[4]

A key consideration in medication optimization and diabetes control is ensuring that when indicated, agents with protective effects are being utilized first. This includes the addition of an agent — or transition to an agent — even if patients have achieved their individualized glycemic goals.[2] For example, antihyperglycemic regimens in T2DM patients with ASCVD or at high risk of ASCVD that include sulfonylureas, thiazolidinediones, dipeptidyl peptidase 4 (DPP-4) inhibitors, or multiple daily insulin injections should be optimized to regimens with cardiovascular benefit even if glycemic goals are already being met.

In patients with T2DM and an A1C not at goal, the ADA guidelines recommend treatment initiation or intensification within three months of findings.[2] However, a systematic review of therapeutic inertia in T2DM found the median time-to-treatment optimization was 0.3 to 2.7 years following an A1C above target.[5] This inaction could be due to many factors, including patient preference or non-adherence, provider preference or knowledge, system or cost barriers, competing demands, or time constraints.[4,6-9]

The ADA guidelines suggest a patient-centered, collaborative, multidisciplinary care team that consists of pharmacists, nurses, or dieticians, among other

health care professionals, and prioritizes timely follow-up and medication adjustments to avoid clinical inertia.[2] Penn Medicine Lancaster General Health is unique in that it has 15 primary care sites with clinical pharmacists who practice under collaborative drug therapy management (CDTM) agreements to manage many chronic disease states, including diabetes.

Clinical pharmacists play a critical role in the multidisciplinary care team, given their medication knowledge, ability to assist providers in achieving patient care goals, and potential to assist in increased GLP-1 RA and SGLT2 inhibitor use.[10] This study was completed to evaluate the utilization of medications with cardiovascular benefit in patients with T2DM and established ASCVD to identify patient populations where future care team collaboration with clinical pharmacists could be beneficial.

METHODS

Study Design

This study was a retrospective, descriptive cross-sectional study conducted in March 2023 using the electronic health record (EHR) looking at charts dated from October 2020 to March 2023. Patients were identified for inclusion if they were 1) managed within an LGHP practice, and 2) diagnosed with T2DM and established ASCVD. The former was defined as having two consecutive A1C values >8% at any point within the study period. The most recent A1C was collected at the time of chart review and reported as >7% or >8% only for the patients not prescribed an SGLT2 inhibitor or GLP-1 RA. A1C values were not trended in this study.

ASCVD was defined as either coronary heart disease (coronary artery disease, coronary atherosclerosis, angina, ischemic heart disease), cerebrovascular disease (ischemic stroke, transient ischemic attack, cerebral vascular accident, cerebral infarction), or peripheral artery disease (atherosclerosis of arteries of extremity with or without claudication, artery occlusion). Patients were excluded if they were younger than 18 years old, pregnant, or on hemodialysis.

Demographics, insurance, A1C values, estimated glomerular filtration rate (eGFR), and LGHP practice location were also collected. Past medical history was obtained via diagnosis codes or International Classification of Diseases, 10th revision (ICD-10) codes within the EHR and included chronic kidney disease, heart failure, pancreatitis, medullary thyroid cancer, multiple endocrine neoplasia syndrome type 2, and diabetic ketoacidosis. The past medical history was chosen by the investigators, as it was hypothesized that

ABSTRACT

Purpose: This study was completed to evaluate the use of medications with cardiovascular benefit in patients with type 2 diabetes mellitus (T2DM) and atherosclerotic cardiovascular disease (ASCVD) in the Penn Medicine Lancaster General Health system.

Methods: A retrospective, descriptive cross-sectional study was conducted in March 2023 using the electronic health record (EHR) looking at charts dated from October 2020 to March 2023. Patients were 18 years of age or older, diagnosed with both T2DM and ASCVD, had two consecutive glycosylated hemoglobin (A1C) values >8% at any point within the study period, and managed within Lancaster General Health Physicians (LGHP) practices. The primary endpoint of this study was to determine the percentage of patients with T2DM with an A1C >7% or >8%, based on their most recent A1C, and established ASCVD who were not on a sodium-glucose cotransporter-2 (SGLT2) inhibitor or glucagon-like peptide-1 receptor agonist (GLP-1 RA). Secondary endpoints included the percentage of that subset who were not currently prescribed an SGLT2 inhibitor or GLP-1 RA and on both basal and bolus insulin, the percentage of patients meeting the diagnostic criteria on three or more oral agents, and the percentage of patients meeting the diagnostic criteria who have Medicaid as their primary insurance coverage. The percentage of patients currently prescribed each antihyperglycemic pharmaceutical subclass was also evaluated.

Results: A total of 1,507 patients were included in this study. Of these, 1,102 patients (73.1%) were currently prescribed an SGLT2 inhibitor and/or GLP-1 RA. Of the 405 patients who were not currently prescribed either of these agents, 346 (85.4%) had an A1C >7% and 244 (60.2%) had an A1C >8%. Of the 405 patients not prescribed either an SGLT2 inhibitor or GLP-1 RA, 28.1% were prescribed a basal and bolus insulin regimen, 9.4% were prescribed three or more oral agents, and 4.2% had Medicaid as their primary insurance coverage. Metformin and insulin were prescribed most often among the 1,507 patients in the study, with 895 (59.4%) and 888 (58.9%) patients having active prescriptions for these agents, respectively.

Conclusion: Overall, there is utilization of SGLT2 inhibitor and/or GLP-1 RA agents in the majority of patients reviewed with T2DM and ASCVD within the LGHP practices. However, there are still many patients with diabetes and ASCVD who are not currently prescribed either medication class of interest.

different histories might affect the prescribing of either an SGLT2 inhibitor or a GLP-1 RA. The study was approved by the Lancaster General Health Institutional Review Board on December 12, 2022.

Study Outcomes

The primary endpoint of this study was a determination of the percentage of patients with T2DM and ASCVD who are not currently prescribed an SGLT2 inhibitor or a GLP-1 RA. We hypothesized that the majority of patients managed by LGHP practices would be prescribed an SGLT2 inhibitor and/or a GLP-1 RA. Secondary endpoints included the percentage of patients not prescribed an SGLT2 inhibitor or a GLP-1 RA who were prescribed a basal and bolus insulin regimen, which consisted of a basal insulin and up to four bolus insulin injections; the percentage of patients prescribed three or more oral agents; and the percentage of patients who had Medicaid as their primary insurance. The percentage of patients prescribed each antihyperglycemic pharmaceutical subclass was also analyzed.

Analyses

Descriptive statistics were used to report baseline characteristics and the percentage of patients currently prescribed either an SGLT2 inhibitor and/or a GLP-1 RA. Logistic regression modeling was performed to determine the odds of being prescribed either medication class of interest. The analysis included variables of interest, either demographic or related to the primary outcome, to determine the effect on the odds of being prescribed either of these agents. The significance level was set to $\alpha = 0.05$ for all statistical analyses. Multiple

Table 1. Baseline Characteristics Between Patients Prescribed a Drug Class of Interest vs. Not

	Prescribed an SGLT2 inhibitor and/or GLP-1 RA (n = 1,102)	Not prescribed an SGLT2 inhibitor and/or GLP-1 RA (n = 405)
Mean age — yr ± SD	66.5 ± 10.9	71.3 ± 12.1
Male sex — no. (%)	659 (59.8)	228 (56.3)
Race — no. (%)		
White	960 (87.1)	366 (90.4)
Black or African American	50 (4.5)	15 (3.7)
Other	92 (8.3)	24 (5.9)
Ethnicity — no. (%)		
Non-Hispanic/Latino	945 (85.8)	371 (91.6)
Hispanic/Latino	151 (13.7)	30 (7.4)
Not reported	6 (0.5)	4 (1.0)
Insurance — no. (%)		
Commercial	325 (29.5)	92 (22.7)
Medicaid	99 (8.7)	17 (4.2)
Medicare	664 (60.3)	287 (70.9)
Other	17 (1.5)	9 (2.2)
Past Medical History — no. (%)		
Chronic Kidney Disease	493 (44.7)	202 (49.9)
eGFR <30 mL/min/1.73²+	111 (10.1)	60 (14.8)
Heart Failure	397 (36.0)	134 (33.1)
Pancreatitis	38 (3.4)	15 (3.7)
History of Medullary Thyroid Cancer	8 (0.7)	6 (1.5)
Multiple Endocrine Neoplasia Type 2	0 (0.0)	0 (0.0)
Diabetic Ketoacidosis	45 (4.1)	21 (5.2)

+At any time within the study period.
SD = standard deviation; eGFR = estimated glomerular filtration rate; SGLT2 = sodium-glucose cotransporter-2; GLP-1 RA = glucagon-like peptide-1 receptor agonist

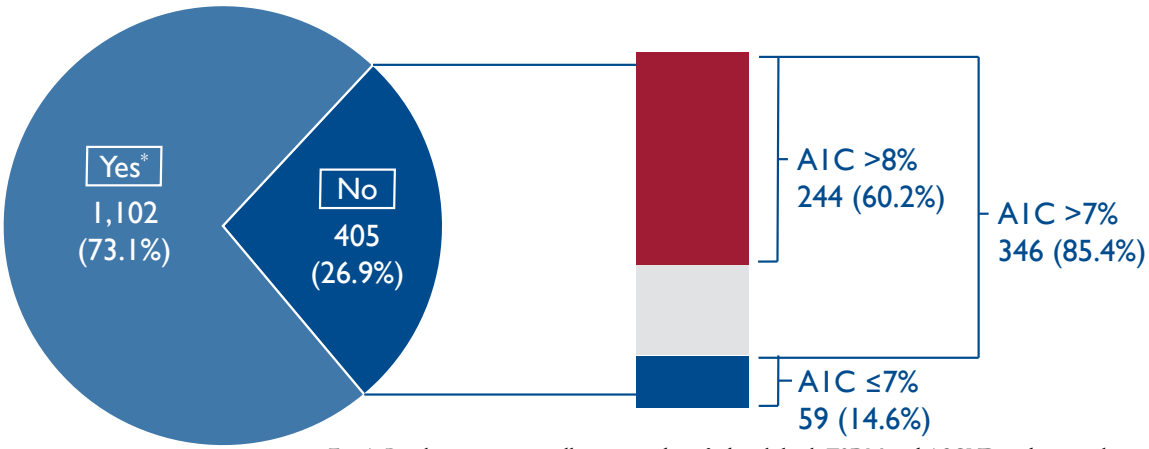

Fig. 1. Pie chart represents all patients identified with both T2DM and ASCVD and currently prescribed an SGLT2 inhibitor and/or GLP-1 RA. Stacked bar chart demonstrates that of the 405 patients not prescribed either an SGLT2 inhibitor or a GLP-1 RA during the study period, most had an A1C above 8% (n = 1,507).

models were performed to describe the adjusted odds ratio of the primary outcome. As this was an exploratory retrospective study, no sample size calculations were completed *a priori*.

RESULTS

Baseline Characteristics

Baseline characteristics are depicted in Table 1. Of the patients who were prescribed a GLP-1 RA or an SGLT2 inhibitor, most had either commercial insurance or Medicaid as their primary insurance carrier as opposed to Medicare. More patients who were prescribed an agent of interest had a diagnosis code consistent with heart failure than did those not prescribed an agent of interest. Patients who were not prescribed either agent of interest were more likely to have Medicare as their primary insurance carrier, a diagnosis code consistent with chronic kidney disease, and a history of an eGFR <30 mL/min/1.73 m^2.

Primary Outcome

Of the 1,507 patients included in this study, 1,102 (73.1%) were prescribed either an SGLT2 inhibitor and/or a GLP-1 RA. Of the 405 patients not prescribed either of these classes, 346 (85.4%) had an A1C >7% and 244 (60.2%) had an A1C >8% most recently (see Fig. 1).

For this analysis, two different A1C cutoffs were described because the quality metric goal in the LGHP organization is an A1C <8% for all patients; however, the ADA guidelines recommend an A1C <7% for most patients. Patient-specific A1C goals were not collected, so both cutoffs were reported.

Secondary Outcome

Of the 405 patients not prescribed either an SGLT2 inhibitor or a GLP-1 RA, 114 patients (28.1%) were prescribed a basal-bolus insulin regimen. Additionally, 38 patients (9.4%) were prescribed three or more oral antihyperglycemic agents, which most commonly included metformin, a sulfonylurea, a DPP-4 inhibitor, and/or pioglitazone. Finally, 17 patients (4.2%) had Medicaid as their primary insurance coverage.

Of the 1,507 patients with indications, not all were prescribed an antihyperglycemic medication. A total of 1,439 patients were prescribed at least one antihyperglycemic medication. Metformin and insulin were the most commonly prescribed medications, appearing in the charts of 895 (62.2%) and 888 patients (61.7%) respectively, followed by GLP-1 RAs and SGLT2 inhibitors in the charts of 767 (53.3%) and 637 (44.3%) patients respectively (see Fig. 2 on page 6).

An additional exploratory endpoint of patients not prescribed either medication class of interest revealed 74 patients (18.3%) were prescribed a DPP-4 inhibitor and almost 90% of this subset had an A1C >7% most recently.

Adjusted Analysis

Adjusted logistic regression analyses were performed to identify characteristics associated with an increased or decreased likelihood of being prescribed an SGLT2 inhibitor or GLP-1 RA while controlling for covariates (see Table 2 on page 7). There were two models performed for the final analysis.

For the first model, neither ethnicity nor type of insurance was associated with a difference in the likeli-

hood of being prescribed an SGLT2 inhibitor or GLP-1 RA when adjusted for age. When adjusted for ethnicity and insurance, each additional increase of one year in age was associated with a 7% decrease in the odds of a participant being prescribed either medication class of interest (OR 0.93; 95% confidence interval [CI] 0.92 to 0.94; p-value <0.005).

For the second model, age, eGFR <30 mL/min/m^2, a history of chronic kidney disease, and a history of heart failure were included as the variables of interest. When adjusted for age, neither having an eGFR <30 mL/min/m^2 nor a history of chronic kidney disease was associated with a likelihood of being prescribed either medication class of interest. Having a history of heart failure increased the odds of being prescribed either agent (OR 1.41; 95% CI 1.06 to 1.88; p = 0.019) when adjusted for age.

DISCUSSION

This study identified that the majority of patients with T2DM and ASCVD managed within the LGHP practices were prescribed an SGLT2 inhibitor and/or GLP-1 RA. However, there is still great potential to optimize therapy. Although the reasons for clinical inertia in this patient population were not explored in this study, previous studies have suggested this could be due to patient preference, comorbidities or risk factors, frailty of the patient, out-of-pocket medication costs, and provider preference or knowledge.[3-9] Based on the statistical analysis of this patient population, age seemed to correlate better than other variables with the odds of receiving either medication class of interest.

Clinical inertia may be due to patient preference. One hypothesis to explain this would be that patients may be reluctant regarding injectable medications.[3,5] However, we found that 30% of patients who were not prescribed an agent of interest were being prescribed an insulin regimen. By instead using a GLP-1 RA, patients might reduce the number of daily injections, their medication burden, and insulin requirements, while improving their cardiovascular risks.

Out-of-pocket costs may also be a barrier to initiation of these agents.[3,9] We could not prove this to be true, but did find that patients with Medicare had decreased odds of being prescribed either medication class of interest compared to patients who did not have Medicare. On the other hand, only 4% of patients who had Medicaid as their primary insurance coverage — and for whom the Pennsylvania Preferred Drug List covers these medications — were not prescribed one of these two classes. While only primary insurances were evaluated in this analysis, previous literature has demonstrated that patients with Medicaid as their secondary coverage may also have fewer out-of-pocket costs.[8]

An exploratory endpoint revealed 18% of patients not on either medication class of interest were

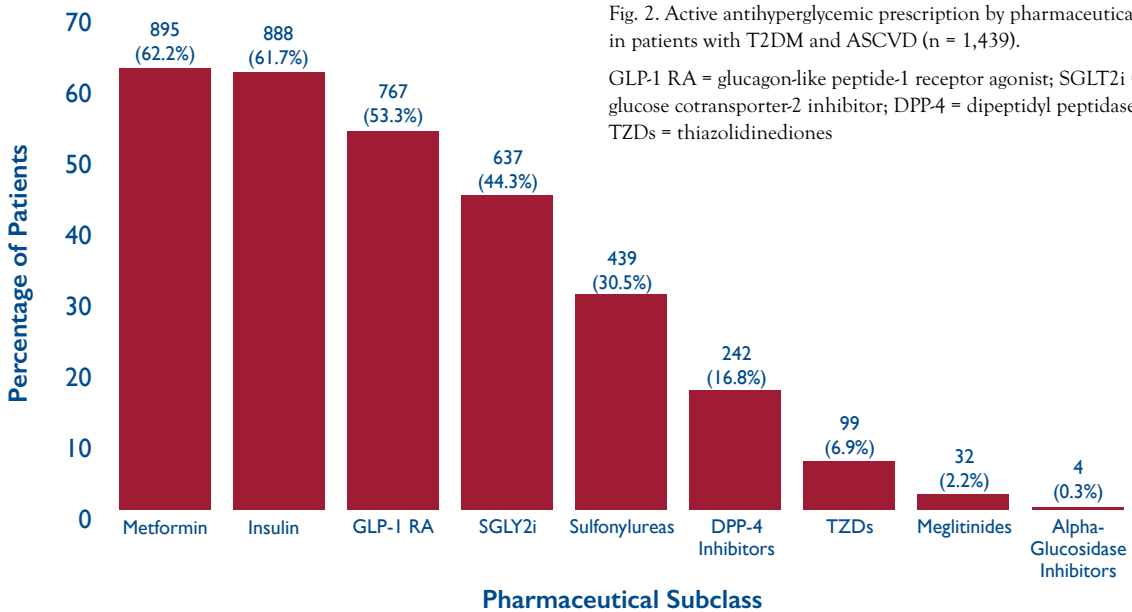

Fig. 2. Active antihyperglycemic prescription by pharmaceutical subclass in patients with T2DM and ASCVD (n = 1,439).

GLP-1 RA = glucagon-like peptide-1 receptor agonist; SGLT2i = sodium-glucose cotransporter-2 inhibitor; DPP-4 = dipeptidyl peptidase-4; TZDs = thiazolidinediones

Table 2. Unadjusted and Adjusted Logical Regression Model Showing the Variable Effect on the Odds of Being Prescribed Either an SGLT2 Inhibitor or a GLP-1 RA

Variable	Value	Unadjusted		Adjusted — Model 1		Adjusted — Model 2	
		OR [95% CI]	*p*-value	OR [95% CI]	*p*-value	OR [95% CI]	*p*-value
Age		0.93 [0.92, 0.94]	0.000*	0.93 [0.92, 0.94]	0.000*	0.93 [0.91, 0.94]	0.000*
Sex	Female	0.80 [0.63, 1.02]	0.075				
Race	Black or African American	1.39 [0.73, 2.65]	0.312				
	Other	1.71 [1.02, 2.88]	0.044*				
Ethnicity	Hispanic/Latino	2.06 [1.32, 3.20]	0.001*	1.50 [0.93, 2.35]	0.101		
Insurance	Commercial	2.09 [1.54, 2.83]	0.000*	0.90 [0.63, 1.30]	0.582		
	Medicaid	5.64 [2.58, 12.30]	0.000*	1.56 [0.64, 3.81]	0.329		
	Other	1.00 [0.41, 2.43]	0.997	0.50 [0.19, 1.34]	0.171		
eGFR <30 mL/min/1.73 m^2		0.60 [0.43, 0.85]	0.004*			0.73 [0.49, 1.09]	0.127
CKD		0.69 [0.55, 0.88]	0.003*			1.14 [0.85, 1.53]	0.389
Heart Failure		1.07 [0.93, 1.38]	0.597			1.41 [1.06, 1.88]	0.019*

**Statistically significant.*
OR = odds ratio; CI = confidence interval; eGFR = estimated glomerular filtration rate; CKD = chronic kidney disease

prescribed a DPP-4 inhibitor. This is notable because DDP-4 inhibitors do not have proven cardiovascular benefit and can be associated with higher costs. Patients could be transitioned to an SGLT2 inhibitor and/or GLP-1 RA and have improved glycemic control and additional cardiovascular benefit without incurring increased costs.

This study has some limitations. Since it is retrospective, data collection was limited to what was available in the EHR and therefore subject to recall bias. For patients prescribed an SGLT2 inhibitor or a GLP-1 RA, we were unable to confirm medication adherence. SGLT2 inhibitor and GLP-1 RA classes were analyzed as a whole rather than by the agents within these classes that have proven cardiovascular benefit. No power analysis was performed prior to this study for the statistical analysis, so it is unknown if this study was appropriately powered to detect a statistically significant difference; however, the odds ratio can provide trends in the data collected.

There are likely many patients with T2DM and cardiovascular disease who were not identified by the rather strict criteria used here, including a search for two consecutive A1C values above 8%. Finally, a history of allergic reaction or intolerance to SGLT2 inhibitors or GLP-1 RA was not analyzed in the patients who were not prescribed either of those agents.

The ADA guidelines recommend an SGLT2 inhibitor and/or GLP-1 RA should be utilized in all patients with established ASCVD or at high risk of ASCVD regardless of their A1C. Findings from this study showed clinical inertia may still be present in patients with T2DM and ASCVD regardless of glycemic control. Although not established during the course of this investigation, there could be several reasons for clinical inertia, including patient preference, provider preference, time constraints, or cost barriers, among others.[3-7]

The ADA recommends that a multidisciplinary team approach be employed to help achieve patient care goals and avoid clinical inertia.[2] Clinical pharmacists have the drug therapy knowledge and are uniquely positioned as part of the multidisciplinary team to focus on time-intensive management in between visits

with the patient's provider. Future research should be done to determine the benefit of a clinical pharmacist as part of the team-based care approach to assist in overcoming clinical inertia, increase access to these agents, and assist in the achievement of patient care goals.

CONCLUSION

Overall, the majority of patients within the LGHP practices diagnosed with T2DM and ASCVD were prescribed an agent with cardiovascular benefit. However, our study demonstrates clinical inertia is still present and identifies opportunities to optimize therapy with either an SGLT2 inhibitor or a GLP-1 RA.

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A Case of Repetitive Monomorphic Ventricular Tachycardia

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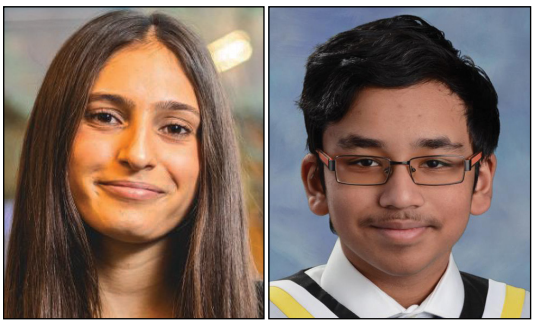

Marwaha Majji

A 56-year-old female with a past medical history of hypothyroidism presents to her family physician with episodes of palpitations and dizziness. She describes these episodes as racing heartbeats and lightheadedness with exercise. She was referred by her family doctor for an outpatient treadmill stress test and a 24-hour ambulatory cardiac monitor. Her resting electrocardiogram (EKG) shows sinus bradycardia at 54 bpm without any significant ST or T wave abnormalities and a normal QT corrected interval (QTc). Her cardiac monitor shows predominantly normal sinus rhythm with 4% premature ventricular contraction (PVC) burden and occasional ventricular couplets and triplets.

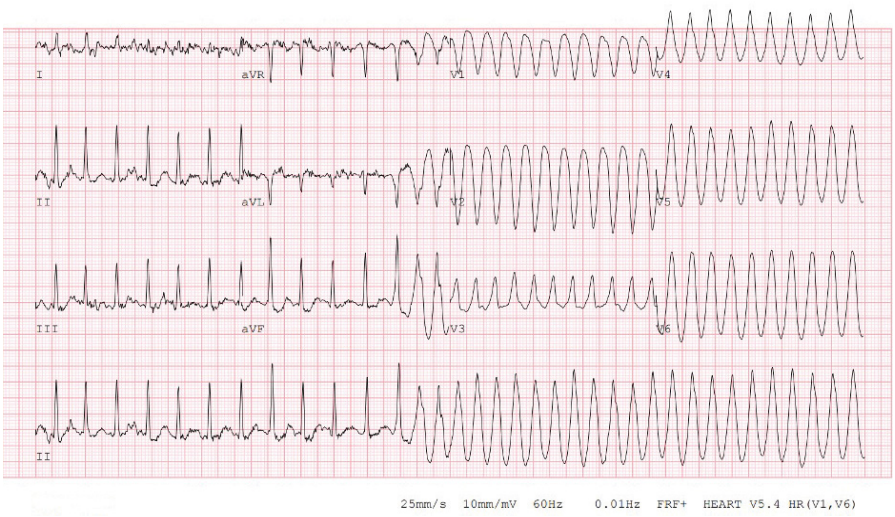

Fig. 1. EKG showing onset of monomorphic ventricular tachycardia.

Her past medical history includes hypothyroidism and exercise-induced asthma. She does not smoke, and only drinks socially and on rare occasions. Her mother had diabetes, hypertension, and dyslipidemia, and had undergone coronary artery bypass grafting in her 50s.

The patient's daily medications include levothyroxine, 88 mcg; vitamin D3 capsule, 2,000 units; fish oil (omega 3) capsule, 1,000 mg; and a multivitamin tablet.

On physical examination, she is afebrile with normal vital signs. She is resting comfortably without any focal findings. Labs reveal a normal thyroid stimulating hormone (TSH) level of 0.90 and normal high-sensitivity troponin levels. The comprehensive metabolic panel and complete blood count are unremarkable. Her lipid profile is normal with a total cholesterol of 147, LDL of 83, HDL of 49, and triglyceride of 74. Her electrocardiogram is normal.

The patient is asymptomatic prior to her treadmill stress test. The patient walks on the treadmill for the first 12 minutes without symptoms. Her EKG does not demonstrate any ST/T wave abnormalities. She has evidence of PVCs and ventricular couplets on EKG during exercise. During the early recovery period, she becomes symptomatic with dizziness

and develops monomorphic ventricular tachycardia (VT) for 30 beats on the cardiac monitor[1] (see Fig. 1 on page 9). She recovers immediately in the supine position, and VT terminates after coughing. After her treadmill stress test, she is admitted to the cardiac telemetry unit for observation and further evaluation of her VT.

During this hospitalization, she undergoes extensive cardiac evaluation including an echocardiogram, coronary computed tomography (CT) angiogram, and cardiac MRI (magnetic resonance imaging). Her echocardiogram reveals a mildly dilated left ventricle with mildly reduced LV function (LVEF 45% to 50%) and mild mitral regurgitation. Her CT angiogram shows a calcium score of 0, consistent with normal coronaries free of stenosis (see Figs. 2-4).

Her cardiac MRI reveals an LV dilation with mildly reduced LVEF of 48% and normal wall motion (see Fig. 5). There is no abnormal myocardial enhancement to suggest prior ischemic damage. However, there is mild basal myocardial septal enhancement (see Fig. 6 on page 12), which could be consistent with a dilated cardiomyopathy or myocarditis. However, there is no evidence of myocarditis on edema-weighted sequences.

DISCUSSION

Ventricular Tachycardia with Structurally Normal Heart

Ventricular arrhythmias are broadly classified based on their duration and morphology. Sustained ventricular arrhythmias are defined as lasting more than 30 seconds in duration, which typically causes hemodynamic collapse and sudden cardiac arrest. Non-sustained ventricular arrhythmias can last less than 30 seconds. Ventricular arrhythmias are also classified as monomorphic (similar QRS morphology) or polymorphic (variable QRS morphology) based on their appearance.

Typically, a malignant ventricular arrhythmia occurs in the presence of structural heart disease such as coronary artery disease with prior myocardial infarction, dilated cardiomyopathy, hypertrophic cardiomyopathy, or arrhythmogenic right ventricular cardiomyopathy. In this situation, ventricular arrhythmia carries a high risk of sudden cardiac death.

Ventricular arrhythmias can also occur with structurally normal hearts. In some situations, these could be associated with underlying electrical channelopathies such as the Brugada syndrome or congenital long QT syndrome. In these patients, ventricular arrhythmias carry a high risk of sudden cardiac death.

Polymorphic VT in the setting of a structurally normal heart can occur with prolonged QT interval and familial conditions such as catecholaminergic polymorphic VT. Ventricular fibrillation in the absence of structural heart disease can be related to metabolic derangements or ischemia. These syndromes are associated with an increased risk of sudden cardiac death.

A monomorphic VT that occurs in the setting of a structurally normal heart carries a benign prognosis. This kind of ventricular tachycardia is commonly grouped together with other idiopathic VT syndromes. Ventricular tachycardia that is not associated with structural organic heart disease can arise in several locations, including the right ventricular outflow tract, tricuspid annulus, right ventricle, left ventricle, left ventricular outflow tract, inferoapical septum, and aortic cusps.

Based on the origin and mechanism, idiopathic VT is broadly classified into three groups:

1. Repetitive monomorphic VT (RMVT), due to triggered activity from the right ventricular outflow tract (RVOT) or left ventricular outflow tract (LVOT).
2. Paroxysmal sustained VT, arising from the right ventricle.
3. Idiopathic left ventricular tachycardia, which is a reentry VT that arises from inferoapical region or mid-septum.

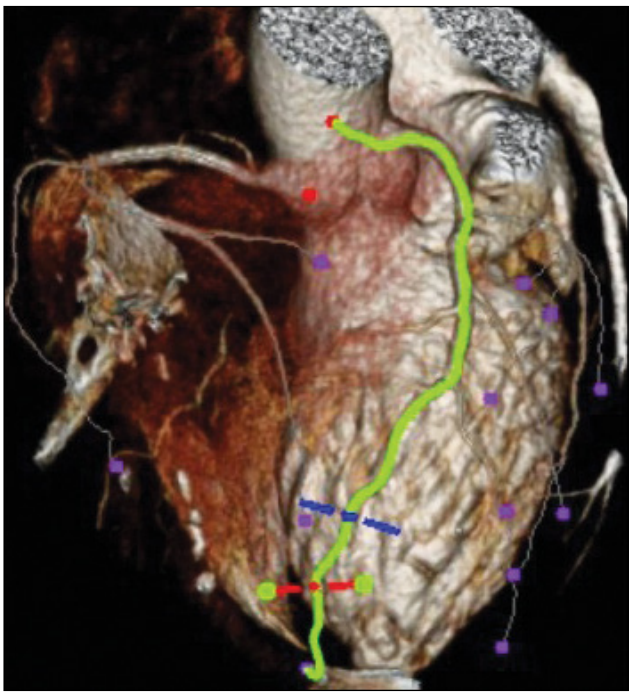

Fig. 2. Cardiac CTA showing three-dimensional volume reconstruction, with LAD coronary artery outlined.

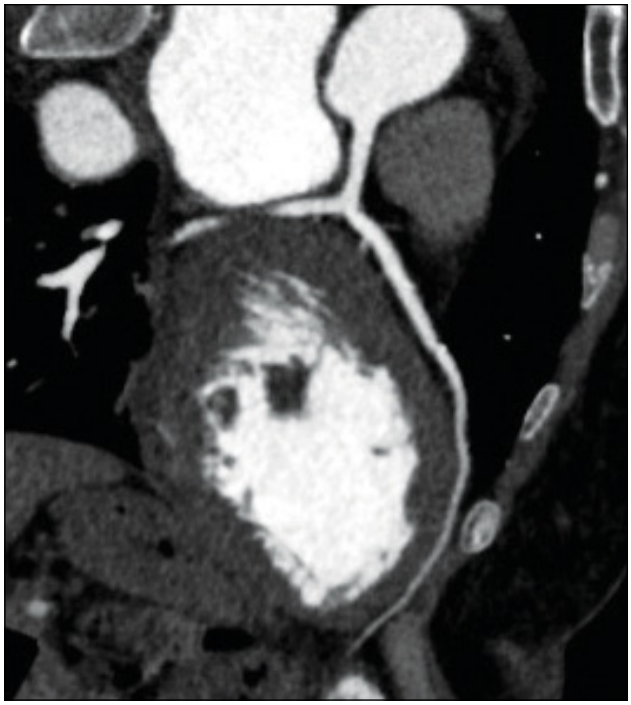

Fig. 3. Cardiac CT of the normal left main and LAD coronary arteries.

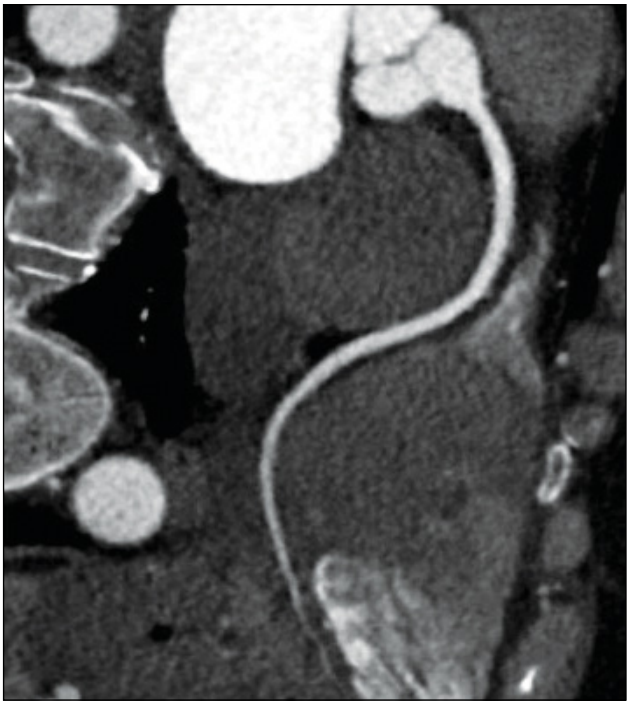

Fig. 4. Cardiac CT showing a normal right coronary artery.

The history may be suggestive. Most arrhythmias are non-sustained (3-15 beats long), although some patients demonstrate sustained episodes. Bursts of non-sustained VT are typically provoked by emotional stress or exercise and may be seen during the warm-down period after exercise, as was noted in our patient.

Arrhythmias may also follow the circadian pattern, with prominent episodes between 7:00-11:00 a.m. and 4:00-8:00 p.m., correlating with periods of high sympathetic activity. Previous studies have demonstrated an association between arrhythmias and hormonal triggers; thus, episodes may be noted during the premenstrual phase, gestational or perimenopausal period, and with use of birth control pills.

To reach this diagnosis means excluding other entities, and thus patients often undergo testing using a variety of diagnostic studies including resting EKG, echocardiogram, exercise stress testing, coronary angiography, and cardiovascular MRI.

Regarding testing, the EKG is diagnostic during VT and shows a left bundle branch block morphology with an inferiorly directed axis. Typically, in LVOT VT, the EKG shows right bundle branch block morphology with an inferiorly directed axis.

Treatment of RMVT includes medications such as beta-blockers, calcium channel blockers, and antiarrhythmic medications. There has also been increasing use of successful radiofrequency ablation[2] in severely symptomatic patients, as well as patients that are refractory to or do not desire long-term drug therapy. Even if the site of origin is not endocardial, epicardial ablation can help successfully treat the arrhythmia.

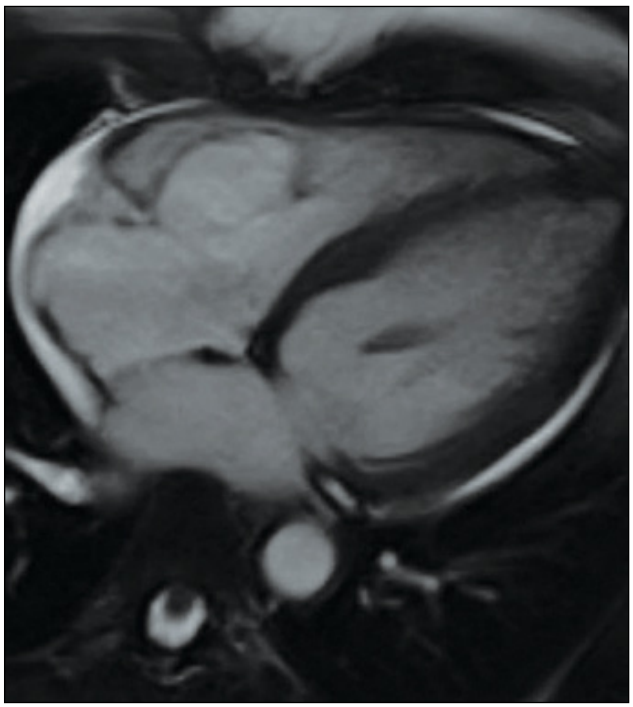

Fig. 5. Cardiac MRI — four-chamber view.

CONCLUSION

Our patient had repetitive monomorphic ventricular tachycardia originating from the right ventricular outflow tract, better known as RVOT VT. This typically occurs in young to middle-aged patients without structural heart disease and is known to have 2:1 female preponderance. It may also be seen in competitive athletes. These patients typically present with symptoms of palpitations and lightheadedness or syncope.

The working diagnosis was thus ventricular tachycardia originating from the RVOT, causing mild cardiomyopathy. The patient was seen by a cardiac electrophysiology consultant and started on oral diltiazem 180 mg daily. She was discharged home for an outpatient electrophysiology study, during which she underwent VT ablation. Her symptoms improved significantly after the ablation. Her follow-up echocardiogram showed normal left ventricular ejection fraction.[3]

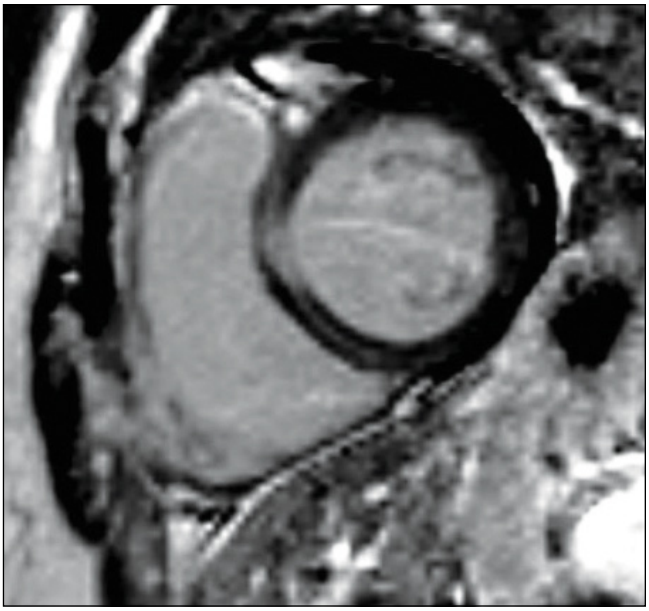

Fig. 6. Cardiac MRI showing delayed enhancement with a mid-myocardial stripe in the basal septum.

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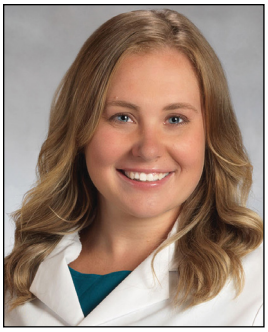
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Duloxetine for Pain

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INTRODUCTION

Chronic pain is widespread, negatively impacts multiple aspects of life, and often coexists with depression and other chronic illnesses.[1] The complex, maladaptive pathophysiology of chronic pain complicates its management, and our society is still recovering from clinicians' widespread misunderstanding regarding long-term opioid therapy and best practices to effectively manage chronic pain.[2]

The prevalence of chronic pain is projected to continue to increase.[2,3] Older adults who live with chronic serious illnesses risk debilitation from comorbid pain, depression, and loneliness.[4] While pain in nonmalignant illnesses is often under-recognized, the prevalence of pain in these chronic conditions can match or exceed the prevalence of pain in people with cancer.

Primary care practitioners provide vital care for patients who can live for years with multiple chronic conditions. It is therefore necessary for all clinicians, particularly those in primary care settings, to comfortably manage patients with chronic pain. Clinicians can leverage low-risk, effective pharmacologic management options to improve the health of the most vulnerable members of our community. Part of the medical community's service is to work to ensure individuals have a quality of life that is acceptable to them as they live with chronic comorbid conditions.

The following cases demonstrate that duloxetine can improve symptom control in ambulatory palliative care.

CASE 1

A 58-year-old male with newly diagnosed metastatic renal cell carcinoma to the bone presents to a palliative care clinic with uncontrolled left hip pain. He reports more than a year of distressing workup prior to the cancer diagnosis.

At the initial clinic visit, the patient is already taking acetaminophen 500 mg four times daily as needed, gabapentin 300 mg twice daily, and citalopram 20 mg daily as needed. He recently discontinued morphine, as its use led to worsening pain and headache.

The exam is significant for reproducible pain at the left hip that radiates to the left leg. He is tearful, due to both hip pain and the emotional weight of his diagnosis.

At the initial visit, he is advised to begin taking duloxetine 30 mg daily and oxycodone 10 mg every four hours as needed. This regimen is selected to target both the depressive symptoms and pain, and to ensure an as-needed medication is available for breakthrough pain.

At his one-week follow-up appointment, the patient reports improved pain and less tearfulness with adherence to duloxetine and use of oxycodone three times per day. The regimen has been well tolerated, yet he feels his symptoms could be better managed. Thus, the duloxetine is increased to 60 mg daily.

At a subsequent follow-up visit one month later, the patient reports improved mood; however, he is experiencing even more pain as his disease progresses. The duloxetine dose is now at the highest recommended dose for cancer-associated pain, therefore higher opioid doses will be used to further control his pain.

CASE 2

A 66-year-old woman with lung cancer presents to a palliative care clinic with persistent, generalized anxiety despite adherence to longstanding duloxetine 60 mg daily and use of diazepam 2.5 mg. The latter was prescribed twice daily as needed, and she reports using it several times per week. She denies pain or other comorbid symptoms.

A plan is initiated to transition her to a selective-serotonin reuptake inhibitor (SSRI) due to inadequate control of anxiety. She is thus started on sertraline 25 mg daily to trial tolerability; one week

later, she reports no adverse effects. Her duloxetine is therefore reduced to 30 mg daily, and sertraline is increased to 50 mg to initiate a cross-taper; this plan is enacted to forgo precipitating serotonin-norepinephrine reuptake inhibitor (SNRI) discontinuation syndrome.

One month later, she returns to the clinic and reports her anxiety is improved; however, she is reporting paresthesia. She had forgotten the duloxetine was also intended to control neuropathy. To dually manage both symptoms with one agent, the SSRI is discontinued and her duloxetine is increased back to 60 mg.

Two weeks later, her neuropathy has improved but her anxiety is worse. Thus, duloxetine is increased to 90 mg daily.

She returns to the clinic two months later and reports she can now leave the house without anxiety attacks for the first time in years and has discontinued use of diazepam. Her husband reports her anxiety is the best it has been in over 20 years and their quality of life has significantly improved.

Over the next eight months she maintains excellent control of neuropathic pain, anxiety, and functional status without use of any opioid or benzodiazepine.

DISCUSSION

Health care practitioners often treat patients with comorbid chronic pain and psychiatric diagnoses. The use of non-sedating adjuvants in this population is clinically relevant as we continue to learn more about the risks of long-term opioid therapy, particularly when co-prescribed with other potentially sedating drugs.

Duloxetine treats a wide range of symptoms and can improve quality of life and functional status. It is an excellent tool to target multiple clinical syndromes, thereby reducing polypharmacy and subsequently decreasing side effect burden.

Duloxetine was first approved by the Food and Drug Administration in 2004 to treat major depressive disorder, and in the next decade it was subsequently approved to treat anxiety.[5] Depression and anxiety are associated with dysregulation of serotonergic and noradrenergic pathways; duloxetine is utilized in treatment of both disorders.[6] Patients treated with duloxetine have improved Hamilton Depression Rating Scale scores, as well as longer duration of recovery between exacerbations of depression, which allows for improved quality of life.

In addition, treatment with duloxetine leads to improved Hamilton Anxiety Rating Scale scores in patients with generalized anxiety disorder.[6] Further studies are needed to identify if this benefit persists in more modern anxiety measurement scales, such as the General Anxiety Disorder-7.

Duloxetine also improves symptoms in chronic pain disorders, and can effectively treat both painful diabetic neuropathy and fibromyalgia.[7] Patients with osteoarthritis of the knee report a significant improvement in Patient Acceptable Symptom State (PASS).[8] This is clinically significant because the PASS score evaluates overall patient well-being and acceptability of treatment. When used off-label to treat chemotherapy-induced peripheral neuropathy — a notoriously difficult-to-manage sequela — duloxetine can decrease pain while also improving numbness and tingling in the feet.[9,10]

As its name implies, duloxetine reduces serotonin and norepinephrine reuptake. It also inhibits dopamine uptake in the prefrontal cortex, which has an impact on the descending spinal pathway of the dorsal horn, decreasing the perception of pain.[9] Doses generally begin with 30 mg daily and may be increased to 60 mg daily after one week. Doses up to 120 mg have been used in some pain syndromes with few adverse effects noted.[8]

Although it has not been studied as extensively for treatment of cancer-related pain, anecdotal evidence suggests duloxetine may help patients with neuropathic cancer-related pain. Adding duloxetine to pregabalin and opioid regimens improves pain more than utilizing pregabalin and opioids alone.[11] This may allow a clinician to reduce opioids and the risk of pharmacologic side effects — and improve quality of life — in this population.

Duloxetine's most promising benefit is its ability to improve overall functional ability and quality of life in all the above-mentioned syndromes. Patients with depression may have improved functional ability with duloxetine treatment.[12] Patients with generalized anxiety disorder may have improved functional status within many social settings (e.g., work and school, social life, leisure activities, and family and home responsibilities).[6]

In addition to improving pain, duloxetine may also improve perceived daily functional status, quality of life, and use of ancillary analgesics.[10] Duloxetine seems to improve overall physical functioning regardless of the tool utilized to measure function, and may improve overall mental function and ratings of well-being.[13] These may be the most critically important aspects to an individual patient when they weigh whether to continue a prescription medication. Further studies should be completed to assess improvement in quality of life and functional status in patients with combined chronic pain and psychiatric illness.

Potential drawbacks to duloxetine include its side effect profile (i.e., nausea, diarrhea, and paradoxical agitation[6]) and the need to taper prior to discontinuation. The risk of SNRI discontinuation syndrome is particularly important in patients who may lose the ability to tolerate capsules by mouth. Discontinuation due to side effects is unlikely; in general, the side effect burden is small enough to manage by splitting the dose into twice-daily dosing or controlling side effects with other as-needed medications.[7,11]

Other adverse effects include hyponatremia (SIADH), hepatotoxicity, serotonin syndrome, suicidality (primarily in adolescents), and changes in libido.[10]

The Number Needed to Treat (NNT) versus Number Needed to Harm (NNH) are relatively similar (see Table 1). It is important to discuss risks and benefits with patients, who may agree that the benefits of improvement in pain, quality of life, and function outweigh the risk of gastrointestinal symptoms. Many patients find that adverse effects do not warrant stopping the medicine.

Smoking decreases the bioavailability of this medicine and may necessitate use of higher doses.[14] Co-administration of long-term medicines that inhibit cytochrome P450 CYP1A2 — of which there are many, including the SSRI fluvoxamine — increase the bioavailability and may necessitate lower doses of duloxetine.[14]

It is worth bearing in mind that the overall improvement in pain scores with duloxetine are modest: this agent is probably safer than tricyclic antidepressants in elderly patients but otherwise should be thought of as comparable to amitriptyline for treatment of many chronic pain syndromes.[15] Data suggest that amitriptyline and duloxetine are essentially equivalent regarding their efficacy for diabetes-related neuropathy; low-dose dual therapy with both agents is an acceptable option as opposed to high-dose monotherapy for this syndrome.[16]

CONCLUSION

An aging population is burdened with multimorbid illnesses, however there are agents at hand to help manage chronic pain syndromes. Clinicians and patients must balance the risks of initiating long-term opioid therapy and take into account chronic pain, psychiatric comorbidities, and social determinants of health, all of which impact quality of life for members of our community. Clinicians must therefore apply an understanding of this complex biopsychosocial interplay to help their patients find safe, effective therapies to treat comorbid symptoms.

Table 1. Clinical Effectiveness of Duloxetine for Various Clinical Syndromes

Syndrome	Dosage	Number Needed to Treat (NNT)	Number Needed to Harm (NNH)
Fibromyalgia[7]	60-120 mg	6.4 (to achieve 50% pain relief)	6.7 (to experience any adverse events)
Painful Diabetic Neuropothy[7]	60-120 mg	5.1 (to achieve 50% pain relief)	6.7 (to experience any adverse events)
Chronic Musculoskeletal Pain[8]	60-120 mg	6 (to achieve PASS for pain due to knee osteoarthritis)	8 (for patients to experience one or more treatment-emergent adverse events)
Major Depressive Disorder[12]	40-120 mg	14 (to reach a Sheehan Disability Scale score of <6)	n/a

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Quality Improvement: Using Text Reminders to Increase SARS-CoV-2 Vaccination Rates

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INTRODUCTION

In March 2020, SARS-CoV-2 began causing serious illness and death in the United States. Soon after, a global pandemic was declared as virologists, epidemiologists, and other health care professionals raced to reduce viral spread, decrease hospitalizations, and decrease deaths related to the virus. Since 2020, there have been more than one million deaths related to COVID-19 in the United States.[1]

In December 2020, the first SARS-CoV-2 vaccine, Pfizer BioNTech, was released for emergency use.[2] Soon after, Moderna released another SARS-CoV-2 vaccine for emergency use, and the influx of individuals seeking vaccination led to waitlists and frustration.[3] Once the vaccines were readily available, those who wanted to get vaccinated had relatively few difficulties obtaining the vaccine.[4]

According to the Centers for Disease Control and Prevention (CDC),[5] to reduce hospitalization and death, the goal SARS-CoV-2 vaccination rate for the United States was 70%. Attainment of this goal was challenged by the large segment of people in the United States who are vaccine resistant (object to receiving a vaccine)[6] and vaccine hesitant (feeling unsure about receiving a vaccine).[1]

By the end of 2020, the CDC reported a decline in total life expectancy by 1.8 years and a 17% increase in total number of deaths in the United States compared to the previous year.[7]

In March 2022, the CDC recorded an average of 383 deaths per week in the nation from COVID-19 in the unvaccinated population, compared to 118 COVID-19-related deaths per week for those who were fully vaccinated (primary series and appropriate boosters).[8]

Looking back to October 2022, Penn Medicine Lancaster General Health had reported 707 COVID-19-related deaths since the start of the pandemic.[9] At that time, the SARS-CoV-2 vaccination rate among the patients at LG Health Physicians Family Medicine Crooked Oak was reported to be 21%, well below the goal vaccination rate of 70%.

A literature review revealed that text message medical reminders (TMMRs) are a simple, low-cost method of increasing vaccination rates. Most of the research on TMMRs and vaccination rates has focused on influenza and Human Papilloma Virus (HPV) vaccines. Penn Medicine conducted two studies focused on increasing influenza vaccination rates and found that a TMMR was associated with increased vaccination rates by 5% and 3.3%, respectively.[10,11] Other studies found a 1% to 4% increase in influenza vaccination rates after sending a TMMR.[12-15]

A systematic review of 163 articles found an average 6% increase in HPV vaccination rates after TMMRs,[16] while other studies found 2.5% to 32% increases in HPV vaccination rates.[17-19] Some authors sent more than one TMMR and found no significant increases in vaccination rates but did report negative feedback from participants related to receiving more than one text message.[16,20,21]

MATERIALS AND METHODS

Project Design, Setting, and Population

The purpose of this quality improvement project was to send a TMMR to Family Medicine Crooked Oak patients who were overdue for a SARS-CoV-2 vaccine, then evaluate if this evidence-based practice would be associated with an increase in the vaccination rate at this family practice center. The intervention included sending one TMMR to patients with information about the safety and efficacy of SARS-CoV-2 vaccines and availability for vaccination.

The vaccination rate pre-text message was compared to the vaccination rate six weeks post-text message, with an intended outcome being a change in SARS-CoV-2 vaccination rate. The data were also analyzed to determine if pre-intervention vaccination status had an impact on likelihood to become vaccinated. This project was conducted over a six-week timeframe, February 2023 through March 2023, with the hope that patients would come for vaccination as soon as they received the medical reminder.

Inclusion criteria encompassed patients that were 18 years and older, English-speaking, had a mobile phone number on file, were overdue for a SARS-CoV-2 vaccine, and saw a medical provider at Family Medicine Crooked Oak. The vaccines were administered at the express care outpatient clinic; however, patients were encouraged to receive the vaccine anywhere that suited them. Since EPIC was the electronic medical record system used by both vaccination sites, only those SARS-CoV-2 vaccine administrations entered into EPIC were available for this project.

Both sites serve urban and rural areas of Lancaster County. Family Medicine Crooked Oak currently has approximately 8,500 patients, of which approximately 7,900 are 18 years and older. Exclusion criteria included patients younger than 18 years who were non-English-speaking, already up to date on SARS-CoV-2 vaccine(s), or lacked access to a mobile phone number. Participants who met the inclusion criteria were sent the text message regardless of gender, ethnicity, or socioeconomic status.

The Health Belief Model[22] was the theoretical framework used to guide the planning of the implementation process and development of the text message script. The articles were evaluated using the Johns Hopkins Evidence-Based Practice Critical Appraisal Tool.

Participant Recruitment and Consent

When patients at this health system provide a mobile phone number, they consent to receiving text messages from the organization. At the time of this project, the only text messages being sent to the patients were appointment reminders and information regarding precautions due to COVID-19.

Further consent was not needed because only patients who had already consented to providing their mobile phone number were included. Participants received a TMMR based on overdue status for SARS-CoV-2 vaccine listed in the health maintenance tab in their electronic health record.

Ethical Considerations — Risks and Harms

This project was evaluated by the Penn Medicine Lancaster General Health Institutional Review Board (IRB) who classified this project as a quality improvement project, which did not require IRB approval.

There were concerns for patient privacy related to receiving text messages, specifically if someone other than the patient was to read the message. To reduce the risk of invading patient privacy, the TMMR script was generic and did not provide any medical information about the patient. It was sensitive to the Health Insurance Portability and Accountability Act (HIPAA) to ensure protection of the patient's health information.[23]

The SARS-CoV-2 vaccination report found in the electronic health record did not contain patient identifiers and was only accessible to this article's authors and the information technology (IT) staff that created the report. The report was not printed or stored anywhere other than EPIC, so there was no need to de-identify patients.

Implementation

The text message was developed with the IT team and approved by the LG Health Marketing team to ensure an appropriate literacy level for patients. Final approval of this scripting was given by the administration involved in this project:

> **Hello from Family Medicine Crooked Oak. We encourage you to get the COVID-19 vaccine. These vaccines are safe and effective and reduce COVID-19 related hospitalizations and deaths. Call XXX-XXX-XXXX (hyperlink) to schedule the COVID-19 vaccine today at our satellite location, LG Health Wellness Express at GIANT on Lititz Pike.**

One text message was sent by the digital consumer specialists at the beginning of the project. Vaccination rates at the family practice were measured immediately prior to sending the TMMR. After the text message was sent, vaccines were administered over six weeks. At the end of the six weeks, the vaccination rate was measured again and compared to the pre-intervention rate.

Table 1. Visual Representation of Sample Size, Vaccination Rates, and Number of Patients Vaccinated

	Total number of practice patients 18 years and older who were sent a text message	Total number of patients overdue for SARS-CoV-2 vaccine who had received at least one vaccine (Group A)	Total number of patients overdue for SARS-CoV-2 vaccine who *had never received a vaccine* (Group B)	Total number of patients considered fully vaccinated against SARS-CoV-2	Vaccination rate for patients 18 years and older who are considered fully vaccinated
Pre-intervention	6,477	4,510	1,967	1,361	21%
6 weeks post-intervention (final)	6,477	4,404	1,847	1,590	24.5%
Number of patients vaccinated after receipt of TMMRs		106	120		
			Percent change in vaccination rate		**+3.5%**

Discrepancies in total numbers due to patients continuing to enter the practice during the course of this process improvement project.

Data Collection Procedure

Data collected through the electronic health record indicated which patients were overdue for a SARS-CoV-2 vaccine. These data were evaluated pre- and post-intervention to evaluate for an increase in the SARS-CoV-2 vaccination rate at the family practice.

The data were separated into two groups, those who had received at least one SARS-CoV-2 vaccine and were overdue for the next dose (deemed Group A) and those who had never received a SARS-CoV-2 vaccine (deemed Group B). The data were also evaluated to determine if pre-intervention vaccination status had an impact on the likelihood of getting vaccinated during the intervention.

RESULTS

Patients were considered fully vaccinated if they had received a SARS-CoV-2 primary series vaccine and any eligible booster vaccine. If they did not receive these vaccines, an alert in the electronic health record triggered eligibility for the vaccine.

Of these patients, 6,477 had a mobile phone number listed, thus 6,477 text messages were sent. The vaccination rate pre-intervention was 21% and at six weeks post-intervention was 24.5%. This resulted in a 3.5% increase in the SARS-CoV-2 vaccination rate at the family practice (see Table 1).

Pre-intervention, 4,510 Group A patients were overdue for a SARS-CoV-2 vaccine; post-intervention, that number fell to 4,404 patients. The same numbers for Group B patients were 1,967 and 1,847, respectively. This resulted in 106 patients receiving vaccinations in Group A and 120 receiving vaccinations in Group B — a total of 226 patients receiving vaccinations.

Statistical analysis was performed on the proportion of patients vaccinated to determine if pre-intervention vaccination status had an impact on the likelihood to receive vaccination. The risk ratio was 2.70 (95% CI: 2.10-3.48), showing that patients with no prior vaccination were 2.70 times more likely to receive the vaccine after TMMR outreach (see Table 2).

Limitations

Among limitations noted, it was found that the same phone number was listed for significant others, so if the spouse who received the text message was already up to date on their SARS-CoV-2 vaccine, the text could have been disregarded despite the possibility that the significant other may have been overdue. It was also unclear if all 6,477 text messages sent were

Table 2. Risk Ratio Computation

	Prior vaccine	No prior vaccine	
Got vaccinated	106	120	
Did not get vaccinated	4,404	1,847	
Total	**4,510**	**1,967**	
Proportion	**0.02 (0.02-0.03)**	**0.06 (0.05-0.07)**	**Risk ratio 2.70 (2.10-3.48)**

received by the patients, as there was no way to track a receipt to the text message.

Additionally, the text messages were only sent in English, so if a non-English speaker received the text message, they may not have known what the message was saying. Patients could have received the vaccine outside of the organization, and if they did not report the vaccination to the family practice, they would still appear overdue for a SARS-CoV-2 vaccine in the report even though they may have been up to date.

During the implementation period (February 2023 through March 2023), the SARS-CoV-2 infection rate increased, and an additional booster dose was approved for administration. This could have led to an increase in the number of patients willing to be vaccinated, therefore affecting the vaccination rate post-intervention.

This project further aimed to reduce barriers to access to the vaccine; to reduce waste, however, vaccines were only approved by health system administration to be given three days per week.

Finally, as opposed to the strict criteria that would be required in a research project, this process improvement project did not limit the entry of patients to the project. As a consequence, the number of patients, as well as the percentage of those who were vaccinated, changed in part due to addition of patients to the practice.

CONCLUSION

The benefits of a SARS-CoV-2 vaccine in reducing hospitalizations and death is indisputable. Vaccine hesitancy and resistance, barriers to access, and misinformation were key components to low vaccination rates during the height of the pandemic. TMMRs can be one strategy to increase SARS-CoV-2 vaccination rates, by helping reduce misinformation and providing easier access to a vaccination site.

This was a process improvement project implementing text mobile messaging with the hope that it would increase vaccination rates. The fact that there is temporal congruence does not suggest causality. To establish causality, one might need to have established a baseline rate of vaccine uptake (which was increasing each day) and then determine whether there was a change in the rate.

Alternatively, one could compare the SARS-CoV-2 vaccination rates at this family practice center to those at a different center in Lancaster where the intervention was not implemented.

What can be stated is:

1. Text messaging was implemented.
2. Text messaging appears to be a relatively low-risk, low-cost intervention.
3. The vaccination rate increased.

This project may have helped increase the SARS-CoV-2 vaccination rate for patients 18 years and older at one family practice. It is notable that the vaccine rate increased among those who had not previously received the recommended course of vaccines. More importantly, this project will hopefully spark interest in the future use of TMMRs for preventative health services.

Factors that may influence the sustainability of this practice change include:

- Engaging senior administration and leadership.
- Providing high-quality evidence-based care.
- Creating a culture for improvement with staff.
- Preventing project fatigue.

Dissemination to administrative leaders who would be interested in implementing TMMRs for SARS-CoV-2 vaccines throughout their organizations is a workable solution for reducing sustainability barriers, skepticism, and resistance to change.[24]

With the tremendous impact of COVID-19 on the community and the evidence of the impact of vaccinations reducing illness, this project was implemented to improve health outcomes. However, this project could have better served the community by examining the usefulness of other types of medical reminders.

For example, TMMRs could have a huge impact on improving compliance with preventative screenings such as mammograms, gynecology screenings, prostate screenings, osteoporosis screenings, colorectal cancer screenings, wellness checks for pediatric patients, and yearly physicals for adults.

Evidence shows that TMMRs can also be useful for increasing vaccination rates for yearly vaccines such as influenza. This simple, low-cost, evidence-based practice could have a major impact on health prevention and wellness if utilized appropriately.

ACKNOWLEDGEMENTS

The authors acknowledge the contributions of all the participants from Penn Medicine Lancaster General Health, as well as Kristen Zulkosky, PhD, RN, CNE, director of the Saint Joseph's University Center for Excellence in Practice (formerly the Pennsylvania College of Health Sciences), who made this project possible. They further thank Kellie Bresz, research data architect at LG Health, for her help with the statistical data.

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Fear Not Buprenorphine

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Editor's note: This is a synopsis of a study conducted at Penn Medicine Lancaster General Health and recently published elsewhere.[1] *JLGH invites primary study authors to publish brief reports of their work for the purposes of further disseminating potentially practice-changing findings such as those discussed here. For more information, contact us via our website at JLGH.org.*

The unique pharmacokinetic profile of buprenorphine makes it the perfect therapy for a patient with opioid use disorder (OUD) to prevent cravings as well as diminish the full effects of opioids. But what happens when that same patient is in a motor vehicle accident and requires analgesia?

Surgeons, anesthesiologists, family medicine providers, and addiction specialists in the past may have recommended that the patient hold buprenorphine[2] — presumably based on concerns regarding its pharmacokinetic profile and not based on recognized clinical outcomes. Pharmacokinetic data show a dose-dependent relationship between buprenorphine and *mu*-opioid receptor occupancy, in which up to 95% of *mu*-opioid receptors can be occupied by buprenorphine at a dose of 16 mg/day.[3,4]

The most recent Substance Abuse and Mental Health Services Administration Treatment Improvement Protocol (SAMHSA TIP 63)[5] provides options for buprenorphine management in the perioperative setting. Providers are encouraged to consider split-dosing, which takes advantage of peak concentrations and may be optimized by having patients take the total daily dose of buprenorphine divided into three-times-a-day or even four-times-a-day dosing. Alternatively, patients may need to utilize higher adjunct doses of full opioid agonists for pain and/or opt to hold or reduce buprenorphine doses. Yet, SAMHSA guidance urges further study.

While some previous reports suggested poorly controlled postoperative pain when patients continue on buprenorphine management, more recent literature and guidance supports continuation of buprenorphine without poor analgesic outcomes.[4,6-9] This continuation strategy is based on data that has shown, despite the high *mu*-opioid receptor affinity of buprenorphine, that some *mu*-receptors remain available for full *mu*-opioid agonist activity.[4,6,10]

An equally important consideration, when devising a perioperative pain plan, is that after a period of temporary buprenorphine hold, reinitiation can become a complicated process. This is due to several concerns. While there may be a potential need to provide high-risk patients with a short course of opioid therapy to be used after discharge, patients also may run the risk of illicit substance use while buprenorphine is being held. Finally, providers may be concerned about the risk of precipitated withdrawal when buprenorphine is resumed.[3-8,11]

With overdose deaths soaring and medication for OUD (MOUD) treatment becoming more commonly prescribed, there is an urgency to provide these patients with the highest quality care in the perioperative setting. For this reason, we aimed to determine, in adult patients requiring acute pain management and maintained on buprenorphine prior to admission, whether:

1. There were differences in MME (morphine milligram equivalents) or pain scores for patients whose buprenorphine was held versus continued.
2. There were differences in MME or pain scores for patients on >12 mg/day versus ≤12 mg/day of buprenorphine.

KEY TAKEAWAY

Overall, continuation of buprenorphine therapy throughout hospitalization provides a simplified management strategy for OUD patients in acute pain, requires significantly fewer MME to achieve similar pain scores, reduces opioid prescription rates at discharge, and allows us to avoid problems associated with buprenorphine reinitiation.

A retrospective chart review was conducted on the cases of 78 patients who were hospitalized at Penn Medicine Lancaster General Hospital from 2017 to 2021. The findings of our study aligned with the recent literature supporting continuation of buprenorphine therapy perioperatively, as patients had significantly increased MME requirements when buprenorphine was held.

We were also delighted to find that continuation of buprenorphine at a daily dose of >12 mg/day compared to ≤12 mg/day did not confer a significant difference in daily average or total MME requirements, nor daily average pain scores (see Fig. 1).

A secondary, but notable, finding identified significantly reduced opioid prescription rates at discharge for those patients whose buprenorphine was continued versus held during the admission (11.3% vs. 31.3%).

Overall, continuation of buprenorphine therapy throughout hospitalization provides a simplified management strategy for OUD patients in acute pain, requires significantly fewer MME to achieve similar pain scores, reduces opioid prescription rates at discharge, and allows us to avoid problems associated with buprenorphine reinitiation.

The takeaway was simple: fear not buprenorphine.

Clinicians should feel comfortable knowing they may continue patients on their prescribed doses of buprenorphine perioperatively or during episodes of acute pain, and expect that by encouraging their patients with MOUD to continue buprenorphine treatment, they can expect better outcomes than if they were to encourage holding/stopping this vital treatment for OUD.[1]

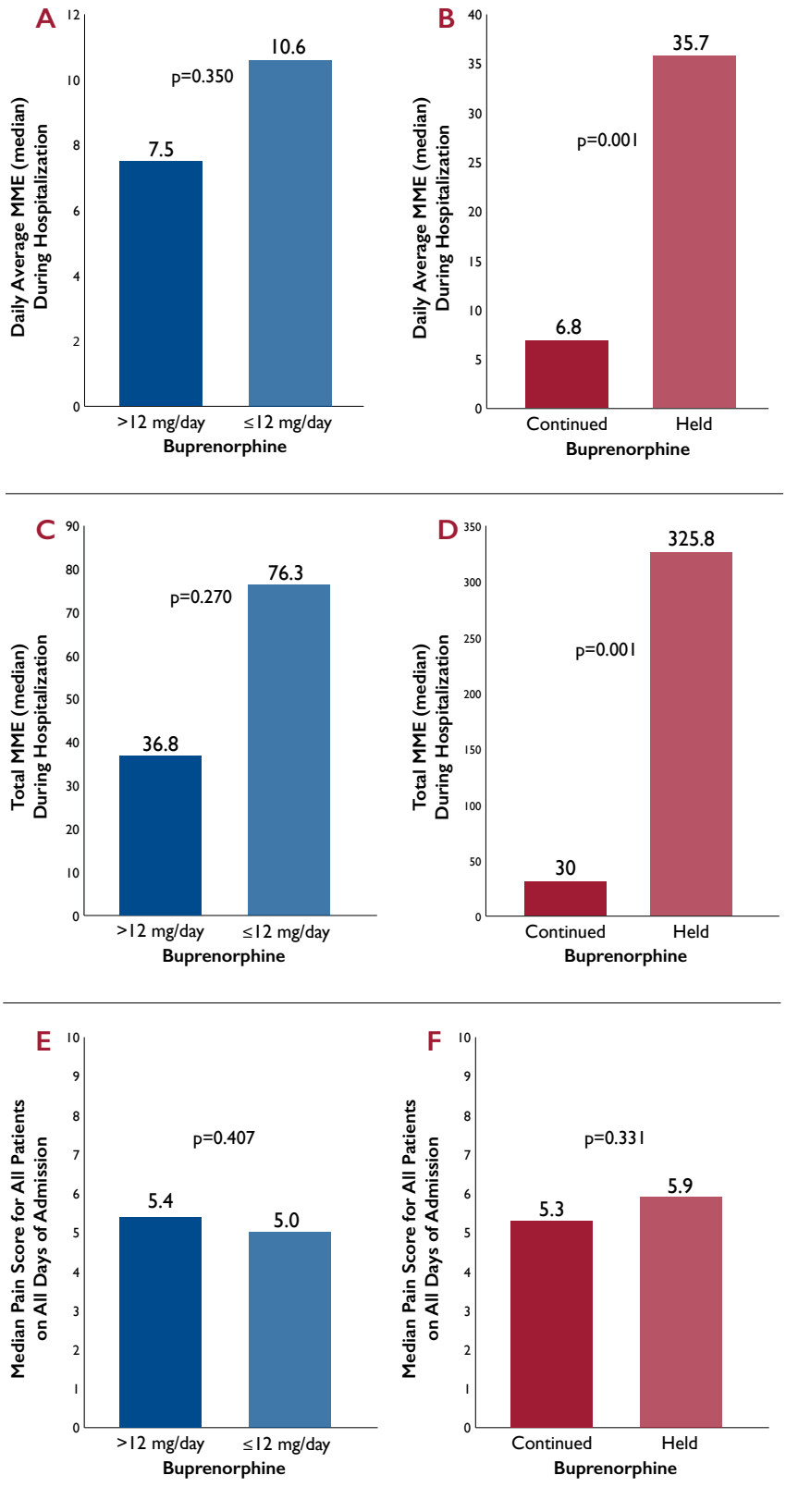

Fig. 1. Comparison of outcomes when buprenorphine continued at a daily dose of >12 mg/day compared to ≤12 mg/day and when continued versus held.

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JLGH Winter 2023 Recap

Q&A for Extended Learning

The Winter issue of The Journal of Lancaster General Hospital *offered articles on alcohol use disorder and medications for rheumatological disorders, as well as a photo quiz on sporotrichosis and other practice recommendations. Review the questions and answers below to see how much you remember from the issue. Need a refresher? All issues of* JLGH *are available online at JLGH.org.*

Q **Which of the following symptoms is not included in the Short Alcohol Withdrawal Scale, which measures the severity of withdrawal for patients attempting to abstain from alcohol use?**
a. Tremors b. Sweating c. Chest pain d. Sleep disturbance

A The answer is: c. Chest pain.

Q **The article "Rheumatology in Primary Care" overviewed three classes of disease-modifying antirheumatic drugs: conventional synthetic, targeted synthetic, and biologic. Which of these is indicated as the preferred initial therapy for moderate-to-severe disease? What drug is offered as an example?**

A Conventional synthetic DMARDs are the preferred class; methotrexate is an example.

Q **What is sporotrichosis?**
How does it generally present?

A Sporotrichosis is an infection caused by a fungus that lives in soil and on plant matter. The emergence of small, painless bumps that develop within one to three months after exposure to the fungus is usually the first symptom.

Q **According to the American Society for Clinical Pathology, why should providers avoid thyroid stimulating hormone (TSH) screening in annual well-visits for asymptomatic adults, regardless of age?**

A Though testing is appropriate when patients are considered at risk or demonstrate signs of thyroid dysfunction upon physical evaluation, there is no evidence that routine TSH screening improves patient care.

PHOTO QUIZ FROM URGENT CARE

Curbside Delivery: A Fracture

Dustin L. Yothers, MSPAS, PA-C
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CASE HISTORY

A 26-year-old male with no significant past medical history presents to Urgent Care with the chief complaint of falling off a curb last evening and rolling his right ankle. He reports 9/10 pain in his right ankle and right foot, and is not able to bear weight. He adds that the pain is radiating to his right lower leg. He denies hitting his head or passing out.

The patient reports no pain elsewhere in the body. He also denies numbness, tingling, cuts, or bleeding. He is not currently taking any daily medications and has no known drug allergies. The patient has no history of orthopedic surgeries.

Upon exam, his skin is intact with gross deformity and edema of the right ankle, with intact distal pulses. He exhibits limited range of motion of his right ankle but can move his right toes. X-rays of the right ankle and foot are pending.

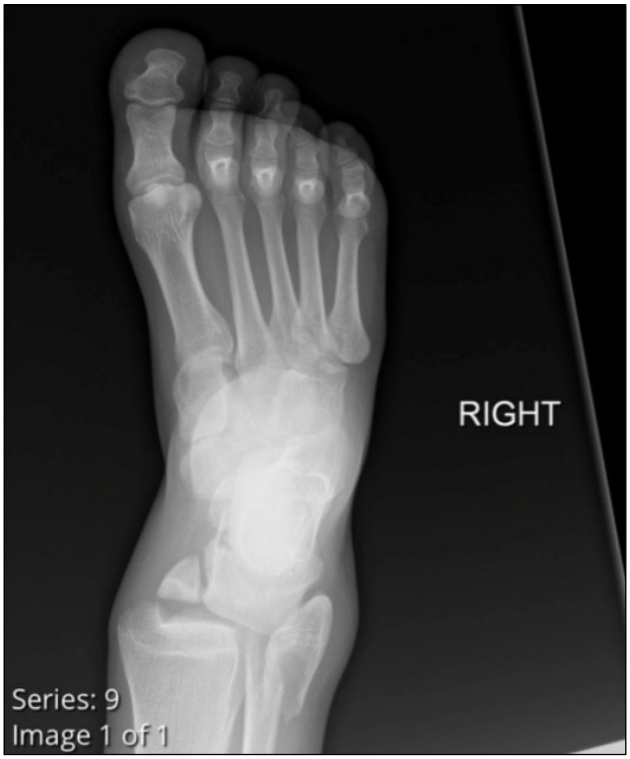

Fig. 1. AP view, right ankle, initial plain film X-ray.

QUESTIONS

1. What rules would you use to determine whether the patient needs X-rays of the ankle?
2. How would you read the initial X-ray (see Fig. 1) of the right ankle?
3. How would you stabilize this patient's ankle?
4. What do you tell the patient will most likely happen next?
5. How soon should the patient return for a follow-up appointment?

ANSWERS

1. Follow Ottawa Ankle Rules, which are available on the MDCalc App. Anterior-posterior (AP), oblique, and lateral radiographs are the standard views obtained if imaging is necessary.
2. The X-ray (see Fig. 1) shows a bimalleolar fracture, including an oblique fracture through the distal fibula with fracture extending into the syndesmosis and a transverse fracture of the medial malleolus. Also seen are en bloc lateral displacement of the tibiotalar joint and foot, as well as associated soft tissue swelling around the ankle.
3. The patient should be splinted with the ankle joint at 90 degrees and remain non-weight bearing; typically, a short leg splint suffices.
4. Unstable fractures generally require operative fixation.
5. Open fractures and any injury with associated neurologic or vascular deficits require immediate orthopedic referral. Fracture dislocations require rapid reduction and referral. Unstable injuries should be referred within a few days.

DISCUSSION

Bimalleolar fractures represent a significant subset (approximately 60%) of ankle injuries, characterized by fractures of the medial and lateral malleoli of the distal tibia and fibula, respectively.[1] The vast majority of these fractures affect middle-aged individuals, often resulting from high-impact trauma or twisting injuries.

The mechanisms involved in these fractures often generate considerable force, leading to substantial disruption of the ankle's stability.

Surgical intervention, such as open reduction and internal fixation (ORIF), remains the gold standard for treating bimalleolar fractures, especially in cases with significant displacement or joint incongruity (see Fig. 2). The main goals of this approach are to restore anatomical alignment and promote functional recovery.[2]

The diversity in surgical techniques and fixation methods utilized across different health care settings influences postoperative outcomes. The radiological results for the treatment of bimalleolar fractures are time sensitive; surgery should be performed as soon as possible, using adequate fixation materials (see Fig. 3), to achieve a better restoration of anatomy.[3]

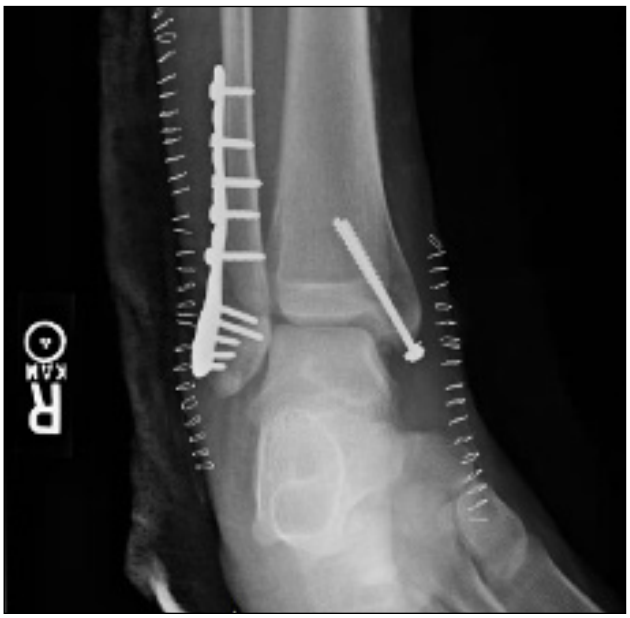

Fig. 2. AP view, right ankle, s/p ORIF.

Complications following bimalleolar fractures and subsequent surgical interventions are not uncommon and can include, but are not limited to, postoperative infections, malunion, nonunion, and hardware-related issues. These complications emphasize the importance of meticulous postoperative care and appropriate follow-up to mitigate adverse outcomes.

Smoking cessation leads to a 40% decreased risk of adverse outcomes.[4] A study of patients who quit smoking for orthopedic surgery revealed a one-year abstinence rate of nearly 50%, suggesting this is an opportune time for the health care community to intervene on the patient's behalf.[4]

Functional outcomes following surgical management of bimalleolar fractures are generally favorable, with most patients achieving satisfactory ankle function and returning to their pre-injury activity levels. However, a subset of patients may experience residual pain, stiffness, or reduced range of motion, potentially impacting long-term quality of life.

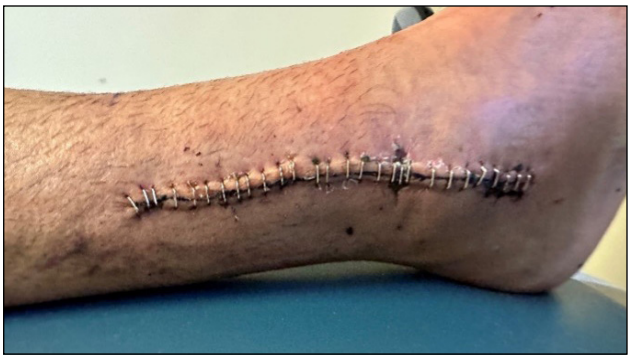
Fig. 3. Lateral view, right ankle, post-op staples.

Rehabilitation programs tailored to individual patient needs play a crucial role in optimizing functional recovery and reducing the risk of chronic disability. One study showed that early weight bearing at three weeks following ORIF of bimalleolar and bimalleolar-equivalent ankle fractures led to no increase in complications or nonunion rates.[5]

In conclusion, bimalleolar fractures pose significant challenges in orthopedic practice, necessitating a comprehensive understanding of their management and associated complications. While surgical intervention remains the cornerstone of treatment, ongoing research and advancements in surgical techniques are imperative to optimize outcomes and improve the long-term prognosis for patients sustaining bimalleolar fractures.

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Editor's note: This is the 18th in a series of articles from the Penn Medicine Lancaster General Health Research Institute that describes ongoing research studies. Other active studies have been described in previous issues of this journal.

Physicians who wish to refer patients for any of the studies mentioned below are encouraged to contact the Research Institute at 717-544-1777. Other members of the LG Health staff who are conducting research and wish to have their studies described here are encouraged to contact the offices of JLGH *at 717-544-8004.*

SPONSORED STUDIES

OCEANIC-STROKE: Phase 3 Study to Investigate the Efficacy and Safety of the Oral FXIa Inhibitor Asundexian (BAY 2433334) Compared with Placebo in Participants after an Acute Noncardioembolic Ischemic Stroke or High-Risk TIA

Sponsor: Bayer
Principal Investigator: Danielle Cross, MD

OCEANIC-Stroke is a randomized, multicenter trial sponsored by Bayer aimed at identifying a better preventative approach to ischemic stroke. The main purpose of this study is to learn whether asundexian, a novel anticoagulant, works better than placebo at reducing ischemic strokes in participants who recently had a noncardioembolic ischemic stroke or temporary stroke-like symptoms when given in addition to standard antiplatelet therapy. It aims to further improve the standard of care with regard to the risk of bleeding.

Participants are randomized to either take oral asundexian or placebo once a day for a treatment period that ranges from at least three months and up to 31 months. Study participants will have follow-up visits approximately every three months during the treatment period via either a phone call or a visit to the study site.

This study will take place in over 30 countries and seeks to enroll more than 9,000 participants. The study team at LG Health, led by Dr. Danielle Cross, plans to enroll about 25 participants locally.

DISCOVER-HCM: Deliver Insights in Hypertrophic Cardiomyopathy and Observational Outcomes in Real World — United States Prospective Registry Study

Sponsor: Bristol Myers Squibb
Principal Investigator: Arpan Patel, DO

This observational registry aims to understand the safety and effectiveness of various medications used in treating symptomatic obstructive hypertrophic cardiomyopathy (HCM). HCM causes focal cardiac muscle thickening, which can obstruct outflow and/or cause valve dysfunction. This registry will also evaluate the impact of these medications on participants' quality of life.

The research team collects information about eligible participants and their condition from their medical records during a five-year period. Participants also complete surveys about their quality of life every three months. Study participation does not require any extra visits to participants' doctors' offices.

LG Health plans to enroll 20 patients into the registry, with nine already enrolled at the time of this article.

PACeS: Anticoagulation for New-Onset Post-Operative Atrial Fibrillation after CABG

Funded by: National Heart, Lung, and Blood Institute
Principal Investigator: Mark Epler, MD

Providers may prescribe anticoagulants or antiplatelet agents to prevent blood clots in patients with post-operative atrial fibrillation (POAF). The primary objective of this prospective, open-label, randomized study is to evaluate the effectiveness (prevention of thromboembolic events) and safety (major bleeding) of adding oral anticoagulation (OAC) to background antiplatelet therapy in patients who develop new-onset POAF after isolated coronary artery bypass graft (CABG) surgery.

This trial randomizes participants (1:1 ratio) to receive OAC (intervention arm) or no OAC (control

arm). They will follow their treatment plan for a 90-day period. Follow-up visits will take place at 90 days (site visit) and at 30, 60, and 180 days (phone call).

The primary effectiveness endpoint is the composite of death, ischemic stroke, transient ischemic attack, myocardial infarction, systemic arterial thromboembolism, or venous thromboembolism at 90 days after randomization. The primary safety endpoint is BARC (Bleeding Academic Research Consortium) grade 3 or 5 bleeding at 90 days after randomization. The overall intent is to evaluate the trade-off in prevention of thromboembolic events versus an increase in bleeding.

Any eligible patients who choose not to participate may enroll in a parallel registry instead. The study team will document patients' baseline risk profiles and treatment strategies in terms of anticoagulants or antiplatelets received. These patients will also be asked to fill out a brief decliner survey.

LG Health was invited to join this study alongside the University of Pennsylvania. Dr. Mark Epler of Cardiothoracic Surgery at LG Health is the local principal investigator working with the study team to enroll about 40 participants.

HERMES: Effects of Ziltivekimab Versus Placebo on Morbidity and Mortality in Patients with Heart Failure with Mildly Reduced or Preserved Ejection Fraction and Systemic Inflammation

Sponsor: Novo Nordisk
Principal Investigator: Amit Varma, MD

The HERMES study is an interventional, randomized, double-blind study designed to evaluate the effects of ziltivekimab versus placebo. Previous studies demonstrated that ziltivekimab, a therapeutic monoclonal antibody delivered subcutaneously, can lower inflammation and have a positive effect on heart failure symptoms. Eligible patients must:

- Have confirmed heart failure diagnosis (NYHA Class II-IV).
- Meet specific echo criteria at screening.
- Have left ventricular ejection fraction greater than 40% documented by echo within 12 months prior to or at screening.
- Meet all other additional inclusion criteria for the study.

Participants will be randomized to receive either ziltivekimab or placebo. The study team will teach them how to inject themselves once a month and how to store the study drug. The study is expected to last for up to four years and requires participants to complete up to 20 study site visits. In addition to these visits, each participant will need to download the study app on their phone to record and share information about all their study drug injections and to fill in questionnaires.

LG Health plans to enroll 30 participants. The sponsor aims to enroll about 5,600 participants at all sites.

ACTIVE CLINICAL STUDIES AT LANCASTER GENERAL HEALTH

A complete list of active clinical studies at Penn Medicine Lancaster General Health is available online.

To access the most current list, scan the QR code below or find the link on the Resources/Links page at JLGH.org.

To make a referral to any study on the list, call the LG Health Research Institute at 717-544-1777.

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Recommendations from the Critical Care Societies Collaborative

Alan S. Peterson, MD
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The American Board of Internal Medicine (ABIM) last year ended its Choosing Wisely initiative, launched in 2012 as a campaign "to spark conversations between clinicians and patients about what tests, treatments, and procedures are needed — and which ones are not." During the campaign, more than 80 specialty societies shared 700-plus recommendations of tests and treatments they said were overused or unnecessary; this journal shared many of those recommendations.

Although ABIM no longer maintains and makes the recommendations available via their website, I will work with *JLGH* to continue to offer information to help readers in their daily practice of medicine. We will review past recommendations and offer new ones where available.

This issue marks my 44th article on Choosing Wisely, with "Five or More Things That Physicians and Patients Should Question" from the Critical Care Societies Collaborative (CCSC). The first set of recommendations below was published in 2015, and in 2021 CCSC added five more. Additional information on CCSC and these items is available online at sccm.org/About-SCCM/Critical-Care-Societies-Collaborative.

RECOMMENDATIONS FROM CCSC (2015)

1. **Diagnostic tests should not be ordered at regular intervals (such as every day), but rather in response to specific clinic questions.** Many diagnostic studies (including chest radiographs, arterial blood gases, blood chemistries and counts, and electrocardiograms) are ordered at regular intervals (e.g., daily). This has been found to increase health care costs and does not benefit patients — it may in fact harm them. It can even contribute to anemia.

2. **Transfusion of red blood cells should not be ordered in hemodynamically stable, non-bleeding ICU patients with a hemoglobin >7 g/dL.** For all patient populations in which it has been studied, transfusing red blood cells at a threshold of 7 g/dL is associated with similar or improved survival, fewer complications, and reduced costs compared to higher transfusion triggers.

3. **Delay in providing nutrition should not be done during the first 24 to 36 hours of a critical illness.** Parenteral nutrition should not be avoided regardless of nutrition risk.

4. **Deep sedation of mechanically ventilated patients should not be done without a specific indication and without daily attempts to lighten sedation.** Several protocol-based approaches can safely limit deep sedation, including the explicit titration of sedation to the highest effective level, the preferential administration of analgesic medications prior to initiating anxiolytics, and a performance of daily interruptions of sedation in appropriately selected patients receiving continuous sedation infusions.

5. **Life support should not be continued for patients at high risk for death or severely impaired functional recovery without offering patients and their families the alternative of care focused entirely on comfort.** Routinely engaging high-risk patients and their surrogate decision-makers in discussions about the option of foregoing life-sustaining therapies may promote patients' and families' values, improve the quality of dying, and reduce family distress and bereavement.

RECOMMENDATIONS FROM CCSC (2021)

1. **Lines, tubes, or drains should not be left in ICU patients that have not been evaluated at least once daily and judged to provide continued patient benefit.** Most hospital-acquired infections and unintended safety events are due to line and drain placements. Reducing time of exposure by assessing continuous need and opportunity for discontinuation of invasive access is in the best interest of patients.

2. **Mechanical ventilator weaning should not be delayed unless there is clinical evidence of need.** Most ICUs assess mechanical ventilation needs daily; however, opportunities for discontinuance can present throughout the day. Current guidelines recommend

removal of mechanical ventilation when it is safe and can be accomplished, as this reduces pain and patient anxiety, minimizes exposure to infection, and promotes liberation as a standard practice.

3. **Discontinuation of antibiotics in culture-negative and asymptomatic patients with sterile cultures should not be delayed beyond 24 hours.** The Society of Critical Care Medicine fully supports the Centers for Disease Control and Prevention's (CDC's) call for hospitals to implement antibiotic stewardship programs to avoid harm to patients from the misuse of antibiotics.

4. **Mobilization of patients should not be delayed beyond 48 hours from ICU admission for patients who passed mobilization safety screening.** The evidence of mobilizing patients who passed safety screens is growing.

5. **Care should be provided if it aligns with the documented patient's and family's goals, values, and preferences for health care.** Five million persons are admitted annually to intensive care units in the United States, and 20% to 40% require mechanical ventilation or other life support. One in five adults admitted to the ICU dies during that hospitalization, and 25% of total health care costs are expended on the 6% of people who die each year.

Accordingly, consideration for documented care wishes is crucial. Establishing goals of care is a crucial component in the decision-making process, aligning care with desired outcomes wherever possible. This recommendation recognizes the importance of empowering and engaging the family in the care plan.

Top Tips

OUTPATIENT TREATMENT OF CONFIRMED COVID-19

Evidence for the use of outpatient treatments in adults with confirmed COVID-19 continues to evolve with new data. The updated version of the American College of Physicians (ACP) living, rapid practice points[1] focuses on 22 outpatient treatments for COVID-19, specifically addressing the dominant SARS-CoV-2 Omicron variant.

This version was developed by the ACP Center for Evidence Reviews at Cochrane Austria at the University for Continuing Education Krems (Danube University and Krems).

- Practice Point 1: Consider molnupiravir to treat symptomatic patients with confirmed mild to moderate COVID-19 in the outpatient setting who are within five days of the onset of symptoms and at a high risk for progressing to severe disease.
- Practice Point 2: Consider nirmatrelvir-ritonavir combination therapy to treat symptomatic patients with confined mild to moderate COVID-19 in the outpatient setting who are within five days of the onset of symptoms and at a high risk for progressing to severe disease.
- Practice Point 3: Do not use ivermectin to treat patients with confirmed mild to moderate COVID-19 in the outpatient setting.
- Practice Point 4: Do not use sotrovimab to treat patients with confirmed mild to moderate COVID-19 in the outpatient setting.

Clinical Considerations

- The living, rapid review did not evaluate comparative effectiveness, meaning evidence does not show if one treatment is more effective than another treatment.
- Risk stratification is an important step in the initial evaluation to decide the best approach to treat COVID-19 in the outpatient setting. The current definition of risk factors for progression to severe COVID-19 disease can be assessed from the CDC's website at the QR code above (cdc.gov/coronavirus/2019-ncov/your-health/risks-getting-very-sick.html).
- Outpatient management of mild to moderate COVID-19 is appropriate for most patients. The decision to initiate treatment for COVID-19 in the outpatient setting should be personalized and based on clinical judgment using an informed decision-making approach about potential treatment benefits, harms, patient characteristics (such as risk factors, comorbid conditions, and disease severity), patient preferences, and social determinants of health.
- Before initiating outpatient treatment for COVID-19, review treatment warnings and precautions as well as all medications and potential drug interactions.

- Viral rebound of SARS-CoV-2 and the recurrence of COVID-19 symptoms have been reported in some patients completing treatment with nirmatrelvir-ritonavir combination therapy.

ANTIBIOTIC REGIMENS FOR COMMUNITY-ACQUIRED PNEUMONIA

Adults with non-severe community-acquired pneumonia (CAP) responded nearly equally to three first-line and alternative antibiotic regimens, based on data from more than 23,000 individuals.

In this study published in *Chest*,[2] the researchers reviewed data from 23,512 consecutive patients admitted to 19 hospitals in Canada for CAP between 2015 and 2021. Patients were treated with one of four initial antibiotic regimens: beta-lactam plus macrolide (BL+M), beta-lactam alone (BL), respiratory fluoroquinolone (FQ), or beta-lactam plus doxycycline (BL+D). Of these, BL+M is generally considered the first-line regimen, the researchers noted.

Overall, the results support dropping BL as a first-line regimen in current guidelines from the American Thoracic Society and the Infectious Diseases Society of America. They further support the recommendation of BL+M, FQ, and BL+D as similarly effective options as listed in other guidelines, applied according to other patient characteristics. For example, "Doxycycline may be preferred over a macrolide in many cases such as macrolide allergy, prolonged QT, or high (Clostridioides) difficile risk," the researchers said.

The results were strengthened by large sample size and use of a comprehensive database that allowed for adjustment for many variables, as well as the availability of complete follow-up data for the time spent in the hospital. Based on the study, clinicians may choose a respiratory fluoroquinolone, a BL+M, or a BL+D for equal effective antibiotic treatment of CAP, based on the best fit for each individual patient.

NEW GUIDELINES ON DIABETES-RELATED LABORATORY TESTING

New guidelines from the American Association of Clinical Chemistry (AACC) and the American Diabetes Association (ADA) address laboratory measures in the diagnosis and management of diabetes. The corresponding article in *Diabetes Care*[3] reminds clinicians to consider test limitations.

One example is a recommendation to collect blood samples for glucose analysis in tubes containing a rapidly effective inhibitor of glycolysis such as a granulated citrate buffer. If unavailable, sample tubes should be placed immediately into an ice water slurry and centrifuged within 15 to 30 minutes to remove the cells.

Another is the recommendation of a confirmatory test when diagnosing diabetes, regardless of the initial test used (A1C, fasting glucose, or oral glucose tolerance test). There is a large intra-individual variation of fasting glucose; the two-hour glucose tolerance test is similarly fraught. This means that if you do the test

one week and then repeat it the next day or a week later, the results will be quite different. This is a reason why confirmation of an abnormal test is important.

Other "strong" recommendations based on "high" evidence levels include:

- Fasting glucose should be measured using venous plasma; to establish the diagnosis of diabetes, a diagnostic cutoff of >7.0 mmol/L (≥126 mg/dL) is appropriate.
- Frequent blood glucose monitoring is recommended for all people with diabetes treated with intensive insulin regimens (multiple daily injections or insulin pump therapy) and who are not using continuous glucose monitoring.
- Routine use of blood glucose monitoring is not recommended for people with type 2 diabetes who are treated with diet and/or oral agents alone.
- Treatment goals should be based on ADA recommendations, i.e., A1C <7% (<53mmol/mol) if it can be achieved without significant hypoglycemia or other adverse treatment effects, with higher targets for special populations.
- Annual testing for albuminuria should begin in pubertal or post-pubertal individuals five years after diagnosis of type 1 diabetes and at time of diagnosis of type 2 diabetes, regardless of treatment.
- Urine albumin should be measured annually in adults with diabetes using morning spot urine albumin-to-creatinine ratio.

Other guidance in the document pertains to use of ketone testing, genetic markers, autoimmune markers, and C-peptides.

U.S. SHORTAGE OF PRIMARY CARE PHYSICIANS

In a KFF Health News editorial,[4] Senior Contributing Editor Elisabeth Rosenthal addresses the shortage of primary care physicians in the United States. She outlines causes of the shortage, as well as proposed solutions.

Causes

- The percentage of U.S. doctors in adult primary care has been declining for years and is now about 25%.
- The number of Americans who don't have usual access to primary care has nearly doubled since 2014 to more than 100 million.
- Lack of usual access to primary care is one reason our coronavirus vaccination rates were low; many of us no longer regularly see a family doctor we trust.
- Primary care practices tend to lack the support staff of profitable orthopedic and gastroenterology clinics.
- The payment structure in the United States favors surgeries and procedures over primary care.

Proposed Solutions

- Hospitals and commercial groups could invest some of the money they earn for surgeries to support primary care staffing, thereby allowing for an increase in the time primary care physicians can spend with patients.
- Reimbursement for primary care visits could be increased — perhaps by enacting a national primary care fee schedule.
- The medical school debt of doctors who choose primary care as a profession could be forgiven.

Rosenthal offers these solutions based on studies showing that a strong foundation of primary care yields better health outcomes overall, greater equity in health care access, and lower per capita health cost.

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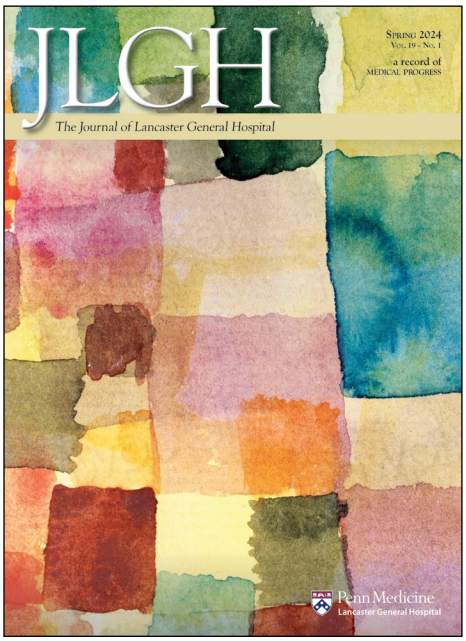

Cover art, Untitled (1914), by Paul Klee (1879-1940).

From the Berggruen Klee Collection at the Metropolitan Museum of Art (not on display).

INTERESTED IN WRITING FOR *JLGH*?

The following is a summary of the general guidelines for submitting an article to *The Journal of Lancaster General Hospital*. Details are located online at JLGH.org.

- Scientific manuscripts are typically between 2,500-4,500 words. Perspective articles are usually shorter, and photo quizzes average about 725 words plus illustrations.
- Medical articles should report research, introduce new diagnostic or therapeutic modalities, describe innovations in health care delivery, or review complex or controversial clinical issues in patient care.
- Reports of research involving human subjects must include a statement that the subjects gave informed consent to participate in the study and that the study has been approved by the Institutional Review Board (IRB).
- Patient confidentiality must be protected according to the U.S. Health Insurance Portability and Accountability Act (HIPAA).
- The Journal of Lancaster General Hospital *does not allow chatbot tools such as ChatGPT to be listed as authors.* JLGH *editors warn authors that the use of these tools poses a risk for plagiarism with inappropriate use of citations, and we require that use of such tools be disclosed.*

Please contact the managing editor, Maria M. Boyer (717-544-8004), Maria.Boyer@pennmedicine.upenn.edu, to discuss submitting an article or for further information.

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EARN CME CREDIT

American Medical Association Category 2 activities consist of self-directed learning or courses that have not been through a formal approval process. According to the Pennsylvania State Board of Medicine, this includes "learning experiences that have improved the care [physicians] provide their patients." Reading authoritative medical literature — like medical journals — is one such activity.

For Pennsylvania physicians, more information and the Pennsylvania Board of Medicine CME Reporting Form are available at LGHealth.org/CME. *For advanced practice providers,* more information is available from credentialing organizations.

Physicians can also log credit and advanced practice providers can access transcripts through their **eeds** accounts online.

← Scan to access your **eeds** account.

← Scan for additional information and links to individual reporting instructions and forms.

CME Special Events at LG Health, Spring 2024

Hot Topics in Primary Care: Guiding Graceful Aging of the Older Adult
Saturday, March 16, 8:00 a.m.-12:15 p.m. Registration deadline: March 14.
Sponsored by the Kenneth and Pamela Brubaker Center for Geriatric Learning Endowment; co-sponsored by Philadelphia College of Osteopathic Medicine

Laurence E. Carroll, MD Lecture, Legacy Event
Monday, April 1, Reception: 5:30-6:15 p.m. Remarks and Lecture: 6:15-7:30 p.m.
The Laurence E. Carroll, MD Lecture Endowment was established by gifts from his friends and family to honor his memory, legacy, passion, and lifelong commitment to medical ethics and continuing medical education.
To make a gift to the endowment, call 717-544-7126.

Patient Simulation Lab — Difficult Conversations Involving Substance Use Disorder
Thursday, May 2, 6:00-7:30 p.m. Sponsored by the Behavioral Health Community Impact Fund

Scan to register. →

Registration is required for these events. For complete details and to register, scan the QR code above or visit LGHealth.org/CME.