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Improving Hepatitis Vaccination Series Completion in Patients Awaiting Liver Transplantation

Shari T. Perez, DNP-C, Noel M. Arring, DNP, Hugo E. Vargas, MD, Bryn M. Corbett, RN, Shawn Ehler, MSN, MBA, Gerald L. Beck, M'hamed Temkit, PhD, Bashar A. Aqel, MD, and Jorge Rakela, MD

ABSTRACT

The aim of this quality improvement project was to improve hepatitis A and B vaccination rates by 20% in patients listed for liver transplant by improving vaccine tracking, ordering/scheduling practices, out-of-network vaccinations, and flagging electronic health records. We audited 101 records; 44 patients were vaccine-deficient. Combined vaccine completion rates improved 94.6% (44.7%-87.0%) after implementing the educational and health record interventions. We believe the results of this study have implications for improving survival and decreasing complication rates for patients with chronic liver disease.

Keywords: electronic health record, hepatitis A, hepatitis B, liver transplant, vaccination

Cirrhosis is the 12th leading cause of death in the United States, with 27,000 deaths occurring annually and the only curative therapy coming from transplantation.[1] As of August 2016, approximately 15,000 people were awaiting liver transplants.[1,2] The prolonged wait-list times for transplant and an overwhelming demand for organs have underscored the need for prevention strategies, including hepatitis A and hepatitis B immunizations.[3,4]

In patients with cirrhosis, acute hepatitis A or B infection is associated with the development of acute-on-chronic liver disease, which has a mortality rate ranging from 20% to 35%.[4,5] However, according to a 2012 report from the US Centers for Disease Control and Prevention, only 25% of individuals with chronic liver disease worldwide were vaccinated against hepatitis A, and the global rate of hepatitis B vaccination increased from 3% in 1992 to 75% in 2010.[6] In addition to mortality risk, patients who are not immune to hepatitis B before transplant and receive a hepatitis B core antibody–positive donor require antiviral therapy for the first year posttransplant and often lifelong. The cost for this therapy is approximately $1,324 per month.[7]

Hence, vaccination completion before liver transplantation is recommended by the Advisory Committee on Immunization Practices, the American Association for the Study of Liver Diseases, and the National Institutes of Health. Furthermore, hepatitis A and B vaccination in patients diagnosed with cirrhosis has been recognized as a quality of care indicator by the US Centers for Medicare & Medicaid Services.

The purpose of this quality improvement project was to evaluate whether a nurse practitioner (NP)-led initiative could improve vaccination completion rates for hepatitis A and B among patients awaiting liver transplantation. The project was designed to compare existing clinical processes for hepatitis A and B vaccination delivery with those from a newly introduced NP-led education program to improve ordering and scheduling practices through use of electronic health record (EHR) patient-tracking tools.

The need for improved vaccination completion rates for hepatitis A and B in our patients listed for liver transplant became evident after disparities in completion rates were found from benchmark data collection. A gap analysis identified key barriers to

vaccination practices, including: (1) lack of an information technology system for vaccine tracking, scheduling, and dose monitoring; (2) incorrect ordering processes by clinical providers; (3) absence of patient involvement and ownership of care for completing vaccinations outside of the transplant center; and (4) an absence of a patient flagging system in the EHR.

METHODS

The institutional review board approved the study at the southwestern center of a 3-campus national transplant program and waived written informed consent for those who provided authorization. Approximately 450 liver transplants are done annually among the 3 campuses, and approximately 120 of these are performed at the southwestern location. Approximately 250 patients undergo evaluation for liver transplant at the southwestern center and, of these, approximately 115 are listed for liver transplant annually.

This project was designed to include patients who required vaccination for hepatitis A and B from April 2014 through September 2014 (N = 44). Each patient had a hepatitis B surface antibody titer and an immunoglobulin G antibody to hepatitis A serum marker performed as part of routine laboratory testing for their liver transplant evaluation. All patients who had a hepatitis B surface antibody level < 10 mIU/mL, as per National Institutes of Health guidelines, were considered nonimmune for hepatitis B; a negative laboratory result for immunoglobulin G antibody to hepatitis A determined nonimmunity for hepatitis A.

Eligibility was determined on the basis of an identified need for vaccination at time of evaluation for liver transplant. For a benchmark (pre-intervention) patient population, used for comparison, we included patients requiring vaccination for hepatitis A and B from April 2013 through September 2013. For the study group, we included all patients who were listed for transplant and required vaccination between April 2014 and September 2014 (for 24 weeks). We included the outcomes of these patients' vaccinations, which occurred 6 months forward from their start date, beginning in September 2014 and ending February 2015, to allow for the 6 months required to complete a vaccine series. For example, a patient starting a vaccination series in April 2014 finished in September 2014, and a patient starting in May 2014 finished in October 2014. Therefore, the last patients enrolled in this study were entered in September 2014, and we evaluated their outcomes 6 months later in February 2015. Hence, we had a total of 24 weeks of patient enrollment to then evaluate 24 weeks of patient outcomes.

Interventions included adding patients to a tracking system, correcting the vaccination ordering and scheduling process, and improving documentation of vaccination administration within the EHR, beginning in April 2014. Vaccination-specific tracking measures for patients awaiting liver transplant did not exist at the initiation of this quality improvement project. To correct this deficiency, the transplant data analyst was instructed to add hepatitis A and B vaccination status information to the departmental database for all actively listed patients. During root-cause analysis, a deficiency was identified in vaccine order entry. Pretransplant registered nurse coordinators, advanced practice providers, and physicians were given group and individual training on correct vaccine ordering using simulated patient charts in the EHR. In addition, we identified barriers to making 6-month calendar appointments for future vaccine doses. Transplant department schedulers were educated on how to identify pending vaccine orders in the EHR until future calendars opened for scheduling.

In December 2015, we introduced another intervention. To improve outside vaccination processes, documentation, and tracking, we created a trifold mail-in card for recording information about hepatitis A and B vaccination, including dosing and timing instructions. Patients who were unable to come to the vaccine clinic at the Transplant Center were given the trifold card, which was to be completed by their primary care provider.

Last, many patients were not completing their vaccination series because the vaccines were not being tracked in the institutional health maintenance module in the EHR, which meant that the patients were not being flagged for provider notification. Our Office of Population Health Management agreed to