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TITLE: Decreasing Time to Initiation of Chemotherapy for Patients Electively Admitted to a Hematologic Malignancy Service.

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Running Title: Decreased time to chemotherapy for elective admissions

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Disclaimers: None

ABSTRACT

Background: Delays in initiating elective inpatient chemotherapy can decrease patient satisfaction and increase length of stay. At our institution, we observed that 86% of patients admitted for elective chemotherapy experienced a delay (greater than 6 hours) with a median time to chemotherapy of 18.9 hours. We developed a process improvement initiative to improve time to chemotherapy for elective chemotherapy admissions.

Methods: Our outcome measure was time from admission to chemotherapy administration in patients admitted for elective chemotherapy. Process measures were identified and monitored. We collected baseline data and utilized performance improvement tools to identify key drivers. We focused on these key drivers to develop multiple plan-do-study-act (PDSA) cycles to improve our outcome measure. Once we started an intervention we collected data every two weeks to assess our intervention.

Results: At the time of interim analysis, we observed a median decrease in time to chemotherapy administration from 18.9 hours to 8.85 hours (p value:0.005). Median time to lab resulted decreased from 3.17 hours to 0.00 hours. There was no change in time from signature to nurse releasing the chemotherapy. We noticed more providers were signing the chemotherapy prior to patient admission.

Conclusions: By implementing new admission workflows, optimizing our use of the Electronic Medical Record to communicate among providers, and improving pre-admission planning we were able to reduce our median time to chemotherapy for elective admissions by 53.2%. Improvement still needed to meet our goals and to ensure sustainability of these ongoing efforts.

Introduction

Patients admitted to the hospital for elective chemotherapy are medically stable, however, numerous processes can cause delays in initiating chemotherapy[1]. These delays lead to wasted time for the patient, decreased patient satisfaction, and unnecessary prolonged length of stay (LOS)[2, 3]. While few studies have evaluated improvement in the inpatient setting[1, 4], in the outpatient setting, studies have shown that decreasing wait times can impact the quality of care and improve patient satisfaction.[5-7] In addition to improving patient satisfaction with decreased wait times, decreasing length of stay may reduce hospital related complications[8-10] and cost of care, not to mention reduce resource utilization.[11, 12]

As a result, using Institute for Healthcare Improvement model for improvement[13] and as part of the American Society of Clinical Oncology quality training program, we developed a new workflow to decrease time to chemotherapy administration in patients admitted electively to an oncology unit.

Quality Improvement (QI) Initiatives at our institution do not require IRB approval, but are submitted to our institutional QI registry database.

Methods

A multidisciplinary team of physicians, pharmacists, nurses, administrators, information technology analysts, pharmacy technicians, and physician assistants participated in discussions and implementation of new processes. We defined a delay in chemotherapy as greater than 6 hours. This definition was based on an informal discussion with patients and physicians regarding an acceptable time for chemotherapy initiation. Time from admission to chemotherapy was defined as time of initial vital signs (best documentation of when the patient arrived on the unit) until time of chemotherapy administration. Length of stay was calculated using time of initial vitals to time of discharge. Other process measure endpoints were determined by EPIC timestamps.

Aim Statement

We aimed to reduce the time from admission to initiation of chemotherapy by 68.3%, from a median of 18.9 hours to a median of 6 hours over 6 months from April to October, 2017.

Plan

A process map was developed (Appendix *Figure 1*). For baseline analysis, we reviewed charts for patients electively admitted for chemotherapy during the month of February, 2017 (24 cases). We measured time from admission to chemotherapy for each elective admission. Other key process measures were identified and median times for each process were calculated (*Appendix Figure 2*). Chemotherapy regimen type did not affect time to chemotherapy (*Appendix Figure 3)*. Data were analyzed using QI macros software (QIMacros, Denver, CO).

Do

Using QI tools such as a fishbone diagram[14] and Pareto Chart [15], we identified several processes causing delays in initiating chemotherapy. We then constructed a PICK chart (*Figure 1*), to determine our interventions: Improve communication between physician and nurses concerning signing of chemotherapy, draw labs prior to admission, and improve time to chemotherapy signature.

1) The first intervention was implemented on 6/22/17. A column in EPIC was added to the nurses' multi-provider screen so they could visualize when the chemotherapy had been signed.

2) The second intervention started on 7/19/17. Patients who arrived at the hospital prior to 4pm would have their labs drawn prior to admission.

3) The third intervention started on 7/28/17. Physicians were notified to sign chemotherapy prior to their patient's admission.

Study

Data after each Plan-Do-Study-Act (PDSA) [16] implementation was collected from 6/22/17 to 10/30/17 at 2 week intervals. P values were calculated using two tailed t-tests.

Act

After reviewing data from the first intervention in mid July 2017, we decided to make a change to the intervention. In addition to communication facilitated through the Electronic Medical Record (EMR), we also discussed all new elective admissions at interdisciplinary rounds. At the same time we were developing our new workflow to have labs drawn prior to admission. On 7/19/17 all patients who arrived for admission prior to 4pm had labs drawn prior to registering for admission. This resulted in an immediate reduction in time to labs resulted and this intervention was adopted as part of our standard workflow. Our last intervention implemented on 7/28/17. This intervention helped improve our time to chemotherapy and was adopted.

Results

Patient characteristics at baseline and for each PDSA cycle are listed in the appendix (Appendix -*Table 1*). Median time from admission to initiating chemotherapy was 18.9 hours. Median times for each step in the process were also calculated (Appendix – *Figure 2*).

Our first PDSA cycle period (15 admissions – Appendix *Table 1*) resulted in no change in time from signature to nurse releasing chemotherapy. Time to chemotherapy for this PDSA was 21.9 hours

Our second PDSA cycle period (7 admissions - Appendix *Table 1*), resulted in a decrease from time of admission to labs resulted from a median: 3.17 hrs (n=38) to 0.00 hours (n=7) (Appendix *Figure 4*). Median time to chemotherapy for this PDSA was 24.9 hours.

Our third PDSA cycle period (50 admissions- Appendix *Table 1*), resulted in an increase in chemotherapy signatures prior to admission from 16% prior to the intervention (n=45) to 37% (n=50) after the intervention. Median Time to chemotherapy for this PDSA was 8.85 hours.

Based on data from April to October 2017 the median time from admission to start of chemotherapy decreased from 18.9 hours to 8.85 hours (p value: 0.005). Average LOS was 161.37 (SD: 141.59) hours at baseline and 125.94 hours (SD: 82.34) after all 3 PDSA cycles were implemented – a 22% decrease in LOS (p value: 0.2847).

Patients who were admitted for chemotherapy, but were not clinically stable were included in this analysis (total cohort n=20). Many of the patients with significant delays over 36 hours fell into this subgroup (n=8), with a median time to chemotherapy of 29.38 hours. Exclusion of these patients from the post intervention group (n=4) still did not result in use reaching our goal of 6 hours (Median – 8.64 hours).

Discussion

Patient centered care is important in healthcare delivery and was the focus of this initiative. While we were successful in decreasing our time to chemotherapy initiation by 53.2% at the time of this analysis, we had not yet reached our goal (6 hours).

In our cohort, our EMR based solution to improve communication was not as effective as we had hoped. This may have been due a poor understanding of which EMR screens the nurses are utilizing most, or an under-appreciation of the fact that nurses spend a significant amount of time in direct patient contact.

Changing the admission workflow to have patient's labs drawn prior to arrival did not have an immediate effect on time to chemotherapy, but we believe it contributed to the overall improvement. The slight increase in time to chemotherapy during PDSA 1 and 2 was likely due to disruption in the normal workflow as this can result in an initial worsening of outcome measures prior to seeing the improvement. Since PDSA #2 was a key driver and the process measure improved dramatically, we moved on to the

next PDSA cycle. We focused on the process and key drivers as leading indicators, understanding that the outcome measure, often considered a lagging indicator, would follow. Our third intervention included signing chemotherapy prior to admission reinforcing the point that pre-preparation is an effective strategy.

Even though approaches have been made to transfer inpatient cancer care to the outpatient setting with success[17, 18], this might not always be possible in the hematologic malignancy population given complexity of treatment regimen and need for close monitoring.

The major limitation to our study is that our data is from a single institution, however most process improvement initiatives begin at single institutions prior to scaling it up across a healthcare network. We included all patients that were admitted electively, including those who were not clinically stable for chemotherapy. Including these patients impacted negatively on our initiation to chemotherapy time, but doing so better reflects actual practice. Our next steps is to improve our pre-admission process to ensure that all patients have appropriate IV access prior to arriving to the inpatient oncology unit and ensuring that they are stable and ready to receive chemotherapy with a pre-admission telephone triage 24-hour prior to admission. This has been successful in prior studies[5].

Another limitation of the study was inability to accurately measure LOS. Time of discharge is difficult to determine in our EMR. As a result, we chose discontinuation of the vital signs order as a proxy for discharge time as it was a consistent event across admissions. Our average length of stay decreased from 161.37 hours to 125.94 hours. In addition, the standard deviation narrowed from 141.59 hours to 82.34 suggesting that implementation of a more standardized workflow decreased variation from one admission to another, which is an important component of a quality improvement initiative. One strength of this intervention was our inter-professional collaboration. We had champions at all touch points in the process making our PDSA cycles widely accepted.

In conclusion, by implementing new admission workflows, optimizing our use of the EMR to communicate among providers, and improving pre-admission planning we were able to decrease time

from admission to initiation of chemotherapy by 53.2%. Further interventions are needed in order to

achieve our objective and standardize the processes.

References

1. Gupta, A., et al., *Reducing Wait Time Between Admission and Chemotherapy Initiation.* J Oncol Pract, 2018. **14**(5): p. e316-e323.
2. Lee, Y.M., *To reduce the average length of stay of patients who are admitted for DA-EPOCH-R chemotherapy regimen.* BMJ Qual Improv Rep, 2015. **4**(1).
3. Lubimov E, S.C., Rojas C, et al., *Chemotherapy admissions: an opportunity to improve the patient experience. Presented at: Oncology Nursing Society 41st Annual Congress; April 28-May 1, 2016; San Antonio, TX.*
4. Arora, V., et al., *Patient satisfaction with inpatient care provided by the Sydney Gynecological Oncology Group.* Patient Relat Outcome Meas, 2010. **1**: p. 179-84.
5. Soh, T.I., et al., *Improving Wait Times for Elective Chemotherapy Through Pre-Preparation: A Quality-Improvement Project at the National University Cancer Institute of Singapore.* J Oncol Pract, 2015. **11**(1): p. e89-94.
6. Gesell, S.B. and N. Gregory, *Identifying priority actions for improving patient satisfaction with outpatient cancer care.* J Nurs Care Qual, 2004. **19**(3): p. 226-33.
7. Gourdji I, M.L., Loiselle C., *Patients' satisfaction and importance ratings of quality in an outpatient oncology center.* J Nurs Care Qual. 18 :43–55, 2003.
8. Group., T.R.F.T.C., *Risk of and prophylaxis for venous thromboembolism in hospital patients*. Brit Med J (BMJ) 305(6853):567–574, 1992.
9. Jeon, C.Y., et al., *On the role of length of stay in healthcare-associated bloodstream infection.* Infect Control Hosp Epidemiol, 2012. **33**(12): p. 1213-8.
10. Wang, T.F., et al., *Risk factors for inpatient venous thromboembolism despite thromboprophylaxis.* Thromb Res, 2014. **133**(1): p. 25-9.
11. Accordino, M.K., et al., *Factors and Costs Associated With Delay in Treatment Initiation and Prolonged Length of Stay With Inpatient EPOCH Chemotherapy in Patients With Hematologic Malignancies.* Cancer Invest, 2017. **35**(3): p. 202-214.
12. Clarke, A., *Why are we trying to reduce length of stay? Evaluation of the costs and benefits of reducing time in hospital must start from the objectives that govern change.* Qual Health Care, 1996. **5**(3): p. 172-9.
13. Langley GL, M.R., Nolan KM, et al., *TheImprovement Guide: A Practical Approach to Enhancing Organizational Performance (ed2). San Francisco CA, Jossey-Bass Publishers, 2009.*

14. Improvement., I.f.H., *Cause and Effect Diagram. Retrieved from http://www.ihi.org/resources/Pages/Tools/CauseandEffectDiagram.aspx.*

15. Improvement., I.f.H., *Pareto Chart.* Retrieved from http://www.ihi.org/resources/Pages/Tools/ParetoDiagram.aspx.

16. Improvement., I.f.H., *Plan Do Study Act.* Retrieved from http://www.ihi.org/resources/ Pages /Tools/PlanDoStudyActWorksheet.aspx.

17. Vaughn JE, O.M., Powell MA et al., *Resource utilization and safety of outpatient management following intensive induction or salvage chemotherapy for acute myeloid leukemia or myelodysplastic syndrome: a nonrandomized clinical comparative analysis*. JAMA Oncol 2015 Nov;1(8):1120-7.

18. Jiang H, L.G., Huang XJ, et al, *Reduced medical costs and hospital days when using oral arsenic plus ATRA as the first-line treatment of acute promyelocytic leukemia*. Leuk Res. 39(12):1319–1324, 2015.