Project Title

Transiting high dose cytarabine consolidation (HiDAC) chemotherapy to outpatient model of care for Acute Myeloid Leukaemia (AML) patients

Project Lead and Members

Project lead:

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Project members:

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- Lee Yee Mei (Head of Oncology Nursing)
- Lee Foong Gwan (Senior Staff Nurse/Leukaemia Nurse Navigator)
- Michelle Poon Li Mei (Senior Consultant)
- Clarice Choong Shi Hui (Associate Consultant)
- Sai Lon Wann (Resident Physician)
- Saw Xiao Shi (Senior Pharmacist)

Organisation(s) Involved

National Cancer Institute of Singapore (NCIS)

Project Period

Start date: January 2019

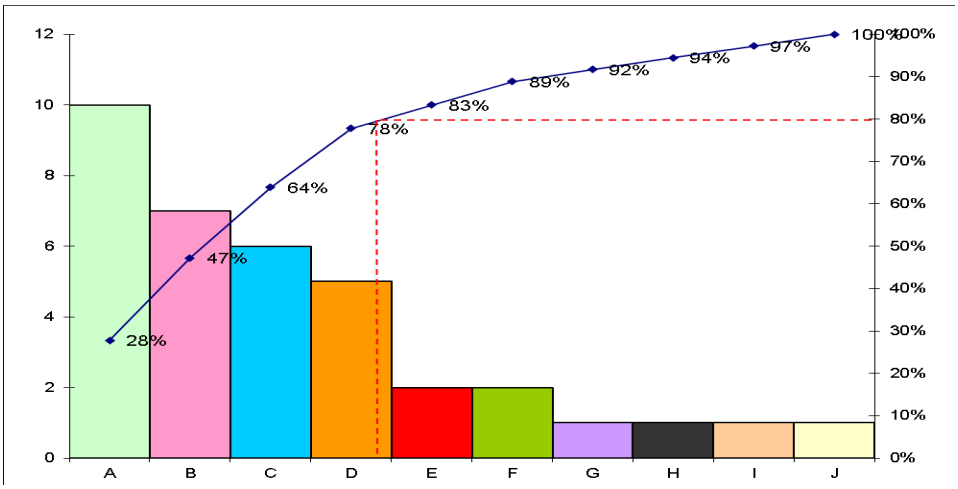
Completed date: December 2020

Aims

This quality improvement project was performed by the team from NCIS, with the aim to reduce inpatient length of stay and promote positive patient experience undergoing chemotherapy treatment.

Project Attachment

Details of the root causes are illustrated using the graph and the table as below:



Cause A Fear of complication
Cause B Lack of family support or no reliable caregiver
Cause C No established workflow, ground unfamiliar with management algorithm
Cause D Outpatient administration of cytarabine challenges (ambulatory pump vs treatment at cancer centre
Cause E Cost out-of-pocket or no insurance coverage
Cause F Lack of resources and outpatient support
Cause G Resistant to change
Cause H Lack of knowledge on evidence
Cause I Ongoing infection
Cause J Poor social setup

Causes	No. of Votes	Cumulative %
A	10	26%
B	8	47%
C	6	63%
D	6	79%
E	2	84%
F	2	89%
G	1	92%
H	1	95%
I	1	97%
J	1	100%

Background

HiDAC chemotherapy for AML consolidation has been traditionally carried out in the inpatient setting due to 12hourly infusion interval. Collective data has shown that patients are stable with mild side effects observed during the entire infusion period.

With rising bed occupancy rates, and patients' request to avoid the 6-day hospitalization which is costly and isolating, the team decided to work on a quality improvement project to transit model of care from inpatient to outpatient setting.

Methods

Assessment of the problem:

Fishbone methodology was used by the team to identify cause and extent of the problem. Five main factors were identified, namely, physician, patient and family, pharmacy and system factors.

Physicians were concerned about the HiDAC related side-effects or complications and whether these potential events can be safely managed in the outpatient setting. Majority were not acquainted with the latest evidence on feasibility of outpatient model of care for patients with AML undergoing HiDAC.

Both patients and their family members were concerned about the financial aspects and out-of-pocket costs while patients were also afraid of troubling their family members to bring them to cancer centre during treatment week. Some patients and their caregivers had the inaccurate belief that the inpatient care was safer, compared to outpatient care.

Pharmacists were worried about logistics in delivering HiDAC in a timely fashion.

System factors-wise, the frontline staff including nurses and operational support staff were concerned about the lack of established management algorithm and unfamiliarity with the new workflow.

Proposed Changes/ Solutions:

Team had worked together to generate the following actions plans:

1. Literature review on overseas studies and practices for outpatient HiDAC to confirm feasibility and safety, and to identify workflow logistics.
2. Collecting baseline data for safety profile analysis using retrospective chart review for local cohort of AML patients.

3. Establish patient eligibility criteria in discussion with physicians in the division.
4. Studying cytarabine pharmacokinetics and working together with the pharmacy team to assess the optimal outpatient administration schedule, without compromising on the treatment efficacy
5. Establishing new workflow for outpatient HiDAC administration
6. Creating a safety network for patients undergoing outpatient HiDAC
7. Refining Pre-HiDAC and post HiDAC clinic consult workflow
8. Engagement of key stakeholders throughout protocol design by:

    i. Educating and updating physicians on latest evidence through department meetings and seeking consensus on the eligibility criteria

    ii. Generating HiDAC side-effect management template for nurses' education

    iii. Updating the operative team (ops) about the new outpatient HiDAC workflow

Strategy for Change/ Intervention

1. Pre-implementation:

Firstly, the project team conducted sharing with division's doctors on the latest evidence on the feasibility of outpatient HiDAC as well as the safety profiles from local cohort patients review. Existing hospital communication platforms such as weekly division meeting and resident teaching rounds were utilised.

Secondly, the project team went down to the ground to conduct a few educational sessions to nurses and supportive staff during routine roll-call sessions. These sessions focused on the workflow and management algorithm on the side-effects of HiDAC administration. The team ride on the existing outpatient fever management algorithm so as not to create another new workflow to prevent unnecessary confusion among the nursing staff. Pharmacy colleagues were also updated by the pharmacy lead on the project team and kept informed of the latest project updates.

2. Implementation (Pilot):

For project implementation, areas that the team focused on included (i) Patient selection criteria, (ii) Management of patients' and their family concerns and

expectations (iii) Actual protocol implementation in the outpatient setting. Members of the team were closely involved with all steps of the workflow and were also readily available to address issues on the ground.

During patient selection process, there was close discussion by the APN/ LNN with the primary physician prior to patient's selection. This communication also provided reassurance that the patient would receive same standards of care as in the inpatient setting. This close engagement with primary physicians was crucial in getting buy in by the physicians.

To manage patient and family anxiety, firstly, patient was approached early prior to outpatient HiDAC and education and counselling was initiated at least 2 weeks prior to the actual enrolment. Patient was then educated extensive on how to utilize the safety network in the event of problems at home post HiDAC. The safety network for patients was established through a number of specific measures, including during office hours, the contact of the LNN was provided. After office hours, emergency memo was provided to all patients in event of fever or other complications.

Acute events occurring in the outpatient setting were escalated directly to the project team. Interventions were carried out by the project members, particularly the APN/Resident physician/LNN, who would be triggered to review patient and who would perform interventions based on the established protocol.

There was constant data collection and review of workflow, and regular engagements with stakeholders (Nursing, physicians and pharmacists) at departmental meeting platforms to gather feedback and further allow further refinement of the protocol.

3. Post Pilot Phase:

Following data review and assessment, decision was made, in consultation with stakeholders to continue HiDAC in the outpatient setting.

Results

Based on the data generated from January 2019 to December 2020, out of the 59 cycles of outpatient HiDAC screened, a total of 46 cycles were eligible (N=46 eligible,

N=13 ineligible). Of these, 35 cycles were successful enrolled, giving a recruitment rate of 76%. Among the 35 cycles of HiDAC enrolled, 31 (89 %) were successfully administered as outpatient, while 4 cycles were interrupted required admission due to fever (N =3) and insurance claim (N = 1). Based on 6 days for each HiDAC cycle, our outpatient model of care has led to a total of 186 bed-days saved for the hospital.

Based on the data analyzed:

1. HiDAC side-effects encountered by patients were acceptable, manageable in timely fashion in the outpatient setting and majority (N = 31/35, 89% of all HiDAC cycles) did not need hospitalization during HiDAC administration.
2. The initial delay in HiDAC administration was with an average of 50 minutes, but with refinement and optimization of chemotherapy timing, this delay was reduced to an average of 18 minutes.

Benefits to patient care:

1. Given the daily high bed occupancy rates (BOR) in NCIS wards, our project helped free up beds for patients needing admission.
2. There was positive feedback from patients who were glad to avoid the prolonged hospitalisations, spend more time with their family as well as reduce risks of nosocomial infections.
3. Possible costs savings to patients: The team will be engaging the NUH VDO team to better clarify costs savings to the system.

Lessons Learnt

i) Study the root causes in-depth before jumping into implementing changes
ii) Teamwork and commitment of the project members
iii) Identify potential issues and generate solutions before implementation
iv) Importance of engaging all key stakeholders to ensure open communication
v) Be present and support the changes on the ground during the initial phase
vi) Update and communicate changes, results to all the stakeholders in a timely manner

Conclusion

Our project provides evidence of the feasibility and safety of a new model of care, and has gained acceptance amongst key stakeholders. Our work provides a robust framework to allow transition of more chemotherapy regimens to the outpatient setting.

Additional Information

Nil conflicts of interest to declare.

Project Category

Care Redesign

Keywords

Care Redesign, Quality Improvement, Workflow Improvement, Patient Experience, Inpatient Care, Outpatient Care, Care Transition, Model of Care, Bed-Days Saving, Time Savings, Oncology, Multi-Disciplinary Team, Medical Services, Nursing, Pharmacy, National University Cancer Institute, Singapore, High Dose Cytarabine Consolidation Chemotherapy, Acute Myeloid Leukaemia

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