

A Digital Touch to Chemotherapeutic Drug Management

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Aster Medcity



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Venture**

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PROBLEM STATEMENT



The problem addressed here was the complexity of chemotherapy orders and associated medication errors during ordering, prescribing, documenting, Transcribing, Dispensing, Administering, Monitoring and planning of chemotherapy.

Study period :

Baseline : January – March 2024

Implementation Phase : April – June , 2024

Post implementation Phase : July- September, 2024

Project Team

Mr. George Kutty John - Software Developer

Dr Ameer - Clinical pharmacist

Dr Dilshad - Clinical Pharmacist

Dr Archana Suresh - Clinical Pharmacist

Dr Priya Karunakaran - HOD – Clinical Pharmacy

Dr Anup R Warriar – Chief of Medical Affairs & Quality

Dr Arun R warriar – Sr Consultant – Medical oncology

Mrs. Vineetha – Oncology Nurse

Mrs. Eliswa Vinu – Oncology Nursing Team leader

FACTORS CONTRIBUTING TO PATIENT SAFETY AND QUALITY IN MANUAL CHEMOTHERAPY CHARTING



PRESCRIPTION ERRORS

- Illegibility in drug name, dose and strength
- Incomplete orders with missing instructions

TRANSCRIBING ERRORS

- Wrong information
- Incomplete clinical information
- Allergy alerts

DISPENSING ERRORS

- Look alike and sound alike drugs
- Improper cross verification process

ERRORS

Stressful working environment

- Wrong Drug Selection
- Incorrect Strength
- Order duplication
- Environmental factors

INDENTING/ ORDERING ERRORS

- Misinterpretation of orders due to illegibility of prescriptions
- Delay in cross verification process

ADMINISTRATION ERRORS

- Wrong patient identification process
- Transportation of chemo chart by unskilled staffs

IPSG VIOLATION

IMPLEMENTATION PHASE (APRIL – JUNE) WORKFLOW OF ELECTRONIC CHEMO CHARTING PROCESS



Clinical Pharmacist's Dashboard

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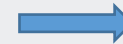
DEPARTMENT OF CLINICAL PHARMACY **CHEMOTHERAPY CHART**

All Draft Submit Submit to OP Signed Indented Closed

Date: Scheduled From 8/29/2024 To 8/29/2024

AsterID: _____ Name: _____ Regimen: [SELECT ALL] Doctor: [SELECT ALL]

| AsterId | Name | Age | Gender | Regimen | Cycle | Status | Date | Doctor | Action | Indent | HIS |
|---------|------|-----------------------|---------|---------|------------|----------------------|--------------|--------|--------|--------|-----|
| 71 | M | ATEZOLIZUMAB | 1 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |
| 65 | F | ERIBULIN MESYLATE | 1 Day-1 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |
| 56 | F | SINGLE AGENT TRAS... | 10 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |
| 27 | M | FLAG IDA | 1 Day-4 | Signed | 2024/08... | Deepak Charles | View & Print | ✓ | ✓ | | |
| 56 | F | TOH | 4 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |
| 69 | M | IRINOTECAN BEVACIZ... | 2 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |
| 79 | M | BR | 1 Day-2 | Signed | 2024/08... | Deepak Charles | View & Print | ✓ | ✓ | | |
| 48 | M | RCHOP | 2 | Signed | 2024/08... | Ashok S Komaranchath | View & Print | ✓ | ✓ | | |
| 68 | M | LEUPROLIDE | 8 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |
| 65 | F | PEM-CARBO | 1 | Signed | 2024/08... | Arun R Warner | View & Print | ✓ | ✓ | | |



CHEMOCHART PREPARATION - User: Luif... 20237*

AsterMedcity **DEPARTMENT OF CLINICAL PHARMACY** **CHEMOTHERAPY CHART**

AsterID: _____ Name: _____ Age/Gender: 51/F

Height: 160 Weight: 66.80 Bsa: 1.72 SCreatin: 0.71 Cycle No: 1 Day 1 Date: 9/3/2024

Doctor: Deepak Charles Regimen: DARA VRD Support Scheme Status: Signed

REGIMEN PLAN

| Generic | Dosing Criteria | Del |
|---------------|-----------------|-----|
| DARATUMUMAB | 16 mg/kg | X |
| BORTEZOMIB | 1.3 mg/sq.m | X |
| DEXAMETHASONE | 40mg | X |
| LENALIDOMIDE | 25mg | X |

Doctor Remarks

PRE-MEDICATION **REGIMEN DRUGS**

| DrugName | Diluent | Dose | Route | Duration | Frequency | Doctor Sign | Comments | Del |
|-----------------------------|--------------------|------|--------------|------------|------------|-------------|----------------|-----|
| DARATUMUMAB DARZALEX 4... | IN 1000 ML 0.9% NS | 1100 | Intravenous | 5 Hours | Once a Day | ✓ Signed | Start at 50... | X |
| BORTEZOMIB BORVIZ 2.5MG... | Not Applicable | 2.2 | Subcutaneous | Stat | Once a Day | ✓ Signed | | X |
| DECMAX 8MG TABLET | Not Applicable | 40 | Oral | Stat | Once a Day | ✓ Signed | | X |
| ZOLASTA 4MG INJECTION | IN 100 ML 0.9% NS | 4 | Intravenous | 30 Minutes | Once a Day | ✓ Signed | | X |
| LENALIDOMIDE LENANGIO 25... | Not Applicable | 25 | Oral | Stat | Once a Day | ✓ Signed | | X |

Patient selection dashboard in the Digital chemotherapy order system

frmIndentView

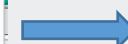
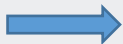
Chemochart Indent Preview

Pre-Medication

| GENERICNAME | ITEMNAME | DOSE | ROUTE | DURATION | FREQUENCY | QTY |
|-----------------------------------|--------------------------|-----------|-------------|----------|------------|-----|
| PANTOPRAZOLE SODIUM SESQUIHYDRATE | PAN IV 40MG INJECTION | 40 mg | Intravenous | Stat | Once a Day | 1 |
| ONDANSETRON | EMESET 8MG/4ML INJECTION | 8 mg | Intravenous | Stat | Once a Day | 1 |
| PHENIRAMINE MALEATE | AVIL 2ML INJECTION | 22.750 mg | Intravenous | Stat | Once a Day | 1 |
| PARACETAMOL | DOLO 650MG TABLET | 650 mg | By mouth | Stat | Once a Day | 1 |

Regimen-Drugs

| GENERICNAME | ITEMNAME | DOSE | ROUTE | DURATION | FREQUENCY | QTY |
|-----------------|--|----------|---------------|------------|------------|-----|
| DARATUMUMAB | DARATUMUMAB DARZALEX 400 MG INJECTION | 1100 mg | Intravenous | 5 Hours | Once a Day | 1 |
| BORTEZOMIB | BORTEZOMIB BORVIZ 2.5MG INJECTION | 2.200 mg | Into the skin | Stat | Once a Day | 1 |
| DEXAMETHASONE | DECMAX 8MG TABLET | 40 mg | By mouth | Stat | Once a Day | 1 |
| ZOLEDRONIC ACID | ZOLASTA 4MG INJECTION | 4 mg | Intravenous | 30 Minutes | Once a Day | 1 |
| LENALIDOMIDE | LENALIDOMIDE LENANGIO 25MG CAPSULE | 25 mg | By mouth | Stat | Once a Day | 1 |
| SODIUM CHLORIDE | NORMAL SALINE 1000ML INFUSION (FREEFLEX) | | | | | 1 |



Digital Approval & Transfer: The approved chart is digitally transferred to the hospital system.

POST IMPLEMENTATION



| Metrics | Base Line (Where you are now) | Post Implementation | Goal (Where you want to reach) |
|---|---|---|---|
| Reduction of errors related to chemotherapy chart preparation process | <p>Total 827 manual chemo charts were audited from Jan - March 2024 and our records and incident reporting indicate the following errors related to the chemotherapeutic drug management process</p> <ul style="list-style-type: none"> • Illegible Prescriptions : 7.01 % (N: 58) • Drug Indenting Errors : 0.24 % (N:2) • IPSG Violation : 0.24% (N:2) | <p>Total 927 electronic chemo charts were audited from July - Sept 2024 and also tracked the incident reporting during this period. Following are the observations ;</p> <ul style="list-style-type: none"> • Illegible Prescriptions : 0% • Drug Indenting Errors : 0 % • IPSG Violation : 0% | To reduce the errors associated with chemotherapeutic errors to 0% |
| Process Efficiency | <ul style="list-style-type: none"> • Average Manual chart preparation time : 20 Mins • Average Chart Transportation Time : 30 Mins • Average Drug Indenting Time : 10 Mins • Average Drug Administration Time : 1 Hour | <ul style="list-style-type: none"> • Average electronic chart preparation time : 1 Mins • Average Chart Transportation Time : 0 • Average Drug Indenting Time : 0.06 Sec • Average Drug Administration Time : 40 Mins | <p>Actual : Reduction in TAT from 2 Hours to less than one hour</p> <p>Achievement: Reduced the TAT from 2 Hours to 42 Mins</p> |
| Cost Optimization | <ul style="list-style-type: none"> • Manpower cost for transportation of chemo chart : 40,000 / month | Reduced the manpower cost associated with chart transportation . The entire project was developed in-house with the team of clinical pharmacist, doctors, nurses and software developer and thus avoided the overhead costs associated with implementing third-party systems. | Zero cost for manpower |

Process Advantage

- Key Factors:**
- Electronic transfer of patient demographic factors including Patient name, Age , Sex , Height and weight of the patient from our Hospital Information System (HIS) to the software . This ensures the preparation of chemotherapeutic chart to the right patient
 - Auto calculation of BSA (Body surface Area) eases the drug calculation
 - Auto population of each and every drug included in the chemotherapy regimen along with the dosing criteria strengthens the cross review process
 - Auto indent generation avoids the time of drug indenting process in a different module which requires individual selection of each drug in the chemo chart. It also helps to eliminate the chance of wrong drug selection during the process of indenting.
 - There is no more time lost on clarifying poorly written or illegible orders.
 - Missing of chemo charts during the manual transferring process to various location of the hospital can also be prevented through digitalization of chart

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Consult

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DEPARTMENT OF MEDICAL ONCOLOGY
CHEMOTHERAPY CHART

Mr. George Antony, 69 Yrs/Male
Aster ID 300434116
DR. RAMASWAMY NV

Chemotherapy regimen: AZACYTIDINE (@ 75 mg/sq.m) x 7 days EVERY 28 DAYS
Cycle No.: 4 Day 1 Date: FEB 08 2024 Indication: AML
Ht: 180 cms Wt: 67.35 kgs BSA: 1.84 sq.m
Transcription verification will be done before Drug Preparation and administration

CHEMOREGIMEN

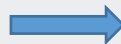
| | Drug and dilution | Dose | Duration | Dr initial | Start time/ Nurse Name/Emp. code | End time/ Nurse Name/Emp. code | Comments |
|-------------|--|---------------|----------|------------|----------------------------------|--------------------------------|-----------------------------|
| FEB 08 2024 | Tab. EMESET | 8 milligram | stat | <i>g</i> | <i>g</i> | <i>g</i> | 150-100-150-100-150-100-100 |
| FEB 08 2024 | Inj AZACYTIDINE IV (XPREZA) in 50ml NS | 150 milligram | 10-20min | <i>g</i> | <i>g</i> | <i>g</i> | |

Transcription verification:

| | |
|---|---------------------|
| Name and Sign of Nurse Team Leader | <i>VINECIA JOSE</i> |
| Name and Sign of Oncology Clinical Pharmacist | DR. MOHAMMED AMEER |
| Name and Sign of Consultant-Medical Oncology | DR. RAMASWAMY NV |

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DEPARTMENT OF CLINICAL PHARMACY
Chemotherapy For: 14/10/2024

Dr. Mobin Paul

| ASTERID | PATIENTNAME | AGE | GENDER | Cycle | Weight | Height | Bsa | SCr Value |
|-----------|--------------|-----|--------|---------|--------|--------|------|-----------|
| 300729580 | Lilly Joseph | 78 | Female | 4 Day-7 | 58.40 | 155 | 1.59 | 0.70 |

Regimen AZACITIDINE VENTOC LAX -> AZACITIDINE (75 mg/sq.m) - Day 1-7, VENIETOC LAX (100 mg) -

Pre-Medication

| Pre Med Drug Name | Pre Med Diluent | Dose | Route | Duration | Sign Doctor | Instruction | Nurse Sign/ Start Time | Nurse Sign/End Time |
|-------------------|-----------------|------|-------|----------|----------------|-------------|------------------------|---------------------|
| EMESET 8MG TABLET | Not Applicable | 8 mg | Oral | Stat | Dr. Mobin Paul | | | |

Regimen Drugs

| Regimen Generic | Diluent | Dose | Route | Duration | Sign Doctor | Instruction | Nurse Sign/ Start Time | Nurse Sign/ End Time |
|-----------------------------|-------------------|--------|-------------|------------|----------------|-------------|------------------------|----------------------|
| AZACYTIN 100MG INJECTION 1S | IN 100 ML 0.9% NS | 118 mg | Intravenous | 30 Minutes | Dr. Mobin Paul | | | |
| VENCLEXTA 100MG TABLET 112S | Not Applicable | 100 mg | Oral | Stat | Dr. Mobin Paul | | | |

Name and Sign of Team Lead

Name and Sign of Oncology Pharmacist

Signed By : Dr. Mobin Paul - 08/10/2024 02:01 PM

Prepared By : Dr. Mohammed Ameer Clinical Pharmacist

