Decreasing the Unplanned Readmission Rate of Patients receiving Outpatient Antibiotic Therapy (OPAT)

Dr. Jose Cadena
Dr. Amruta Parekh

University of Texas Health Science Center at San Antonio
San Antonio, TX
CONTACT

Jose Cadena, M.D.
(210) 567-1871
cadenazuluag@uthscsa.edu
TEAM

• PHYSICIANS
  Chief / Medical Service – Jan Patterson, MD
  Infectious Disease Fellow – Jose Cadena, MD

• FACILITATOR
  Amruta Parekh, MD, MPH

• NURSING
  Irene Cataldo, R.N.
  Theresa Gore, RN.

• PHARMACY
  Kelly Echeverria PharmD

• TECH/STATISTICAL SUPPORT
  Wayne Fischer, MS, PhD
LIST OF CUSTOMERS

• PATIENTS

• PROVIDERS

• NURSING

• PHARMACY

• HOSPITAL ADMINISTRATION
AIM STATEMENT

To decrease the unplanned readmission rate of patients receiving outpatient antibiotic therapy (OPAT) due to infection, line complications or adverse drug reactions by 30% by December 2008 at ALMVA hospital.
What was the VA working with?

- We retrospectively evaluated the failures among patients receiving OPAT at the ALMVA over a 3 month period.

<table>
<thead>
<tr>
<th>Table of Rates</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of Adequate Follow up</td>
<td>32%</td>
</tr>
<tr>
<td>Rate of readmission</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>(54% of which within 2 weeks)</td>
</tr>
<tr>
<td>Rate of Central Line Complication</td>
<td>12%</td>
</tr>
<tr>
<td>Rate of Antibiotic Complications (rash, C difficile associated disease-CDAD, failure)</td>
<td>36%</td>
</tr>
<tr>
<td>Patients alive at end of therapy</td>
<td>84%</td>
</tr>
<tr>
<td>Patients with microbiological diagnosis</td>
<td>68%</td>
</tr>
</tbody>
</table>
PROCESS FLOW - Pre Intervention

1. Patient referred by treating physician
2. Interview patient by ID Pharm D. Is OPAT an alternative?
3. Can patient do FU w/ Clinic physician Within 2 weeks?
4. Notes by referring MD and RN addressing Home Health Requirement
5. Fill out SW consult
6. Care Coordination Involved
7. Confirm that everything is ready with care coordination
8. Patient discharged home
9. Treatment initiated in Hospital or Clinic

Flowchart:
- Patient referred by treating physician
- Interview patient by ID Pharm D. Is OPAT an alternative?
- Can patient do FU w/ Clinic physician Within 2 weeks?
- Notes by referring MD and RN addressing Home Health Requirement
- Fill out SW consult
- Care Coordination Involved
- Confirm that everything is ready with care coordination
- Patient discharged home
- Treatment initiated in Hospital or Clinic

Steps:
- Patient referred by treating physician
- Interview patient by ID Pharm D. Is OPAT an alternative?
- Can patient do FU w/ Clinic physician Within 2 weeks?
- Notes by referring MD and RN addressing Home Health Requirement
- Fill out SW consult
- Care Coordination Involved
- Confirm that everything is ready with care coordination
- Patient discharged home
- Treatment initiated in Hospital or Clinic

Care Coordination:
- Referring MD or PCP Needs admission?
- Care coordination
- Care Coordination Involved
- Confirm that everything is ready with care coordination
- Patient discharged home
- Treatment initiated in Hospital or Clinic

Follow-up:
- Follow up at the clinic when available Weekly labs No adverse Events & infection resolved?
- Home Health monitors treatment related events. IS EVERYTHING OK?
CAUSE & EFFECT DIAGRAM

Patients
- Irregular FU
- Unable to care for self
  - Patient unwilling to receive OPAT

Hospital Physicians
- Mental disorders
- Inadequate Abx selection
  - No F/U arranged
  - Medically unstable
  - IVDU, Alcoholism

Hospital Social work
- Lack of transportation
- Inadequate Environment
- Lack of Social support

Venous Access
- Lack of PICC nurse support
- Line infection
- Line clotted
- Line removed

Hospital PharmD
- Inadequate Abx selection

Hospital Nursing
- Nursing requirements not assessed
- Inadequate education

Clinic Physician
- Unable to deal with side effects
  - No appointments available

Increased R/O failure & re-admission in patients receiving OPAT

Coordination of efforts
BACKGROUND

• Outpatient Antibiotic Therapy (OPAT) is an alternative to inpatient care. It is safe and effective when used properly.

• **Proper assessment** of the patients required: OPAT indication, social situation and comorbidities

• Ordering physician: Should be **aware** of the team work, communication, monitoring and outcome measurements!

• Patient should be **informed of his responsibilities** and plan to follow up.

• **Antibiotics**: Proper choice, dosing and monitoring. Initiated in hospital or clinic.

PERTINENT POINTS FROM LITERATURE

• OPAT is a complex process. A Healthcare Failure Mode Effect Analysis has shown that OPAT may have 6 processes, 67 sub-processes and 217 possible failures.

• Our project was a first step to standardize and improve the process.

Mandatory ID consultation for OPAT

• Infectious diseases consultation results in change in management of 88.6% patients considered candidates for OPAT

• Mandatory ID consultation decreases cost by $760 per patient.

• High success rate of therapy (97%)

But remember……

• OPAT may have 6 processes, 67 sub-processes and 217 possible failures.

How

• Infectious Disease Physician and ID PharmD:
  – **Review cases** to make sure that therapy is appropriate
  – Ensure **ID clinic follow up** when appropriate
  – **Address** complications in the clinic
  – **Review the patient** to make sure they are able to care for themselves.
  – **Discuss** with team and patient goals and responsibilities of therapy.

• **Constant communication** between MD, Pharm D, RN and home health.
Preintervention data of readmissions during treatment

% readmitted on Tx

Months

January  February  March  April  May  June  July
Postintervention data of readmissions during treatment

% readmitted on Tx

Preintervention

Postintervention

UCL

82.8

CL

30.8

LCL

-20.2

January  February  March  April  May  June  July

August  September  October  November  December

49.9

16.7

-16.6

-37.2

-17.2

2.8

22.8

42.8

62.8

82.8
Readmissions at 3 months

Pre intervention: 28.9 per 1000 OPAT days

Post intervention: 12.1 per 1000 OPAT days
# Rate of completion of parental therapy

<table>
<thead>
<tr>
<th></th>
<th>Preintervention</th>
<th>Postintervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number</td>
<td>47</td>
<td>37</td>
</tr>
<tr>
<td>Completed Treatment</td>
<td>26 (55%)</td>
<td>30 (81%)</td>
</tr>
<tr>
<td>Did not complete</td>
<td>21 (45%)</td>
<td>7 (19%)</td>
</tr>
</tbody>
</table>

Postintervention rate of completion of parental therapy was better

p=0.04
## Complications Requiring Readmissions

<table>
<thead>
<tr>
<th>Complication</th>
<th>Pre intervention N: 47</th>
<th>Post intervention N: 37</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF/Volume overload</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>ARF, electrolyte disturbance</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>PICC line Infection/removal</td>
<td>4 (2/2)</td>
<td>0</td>
</tr>
<tr>
<td>Amputations</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Worsening Infection</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>SJS/Severe rash/toxicity</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>All-Cause Mortality</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17 (36%)</strong></td>
<td><strong>4 (13%)</strong></td>
</tr>
</tbody>
</table>

Number of patients with serious complications requiring readmission reduced in the post intervention period.
## Complications (overall)

<table>
<thead>
<tr>
<th>Complication</th>
<th>N:47</th>
<th>N:37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Renal Failure</td>
<td>3 (6%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>3 (6%)</td>
<td>0</td>
</tr>
<tr>
<td>PICC problems</td>
<td>4 (9%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Amputations</td>
<td>4 (9%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Unrelated readmissions</td>
<td>6 (12%)</td>
<td>5 (14%)</td>
</tr>
<tr>
<td>Worsening Infection</td>
<td>8 (17%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>SJS/Severe rash/toxicity</td>
<td>2 (4%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>All-Cause Mortality</td>
<td>2 (4%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>
## Follow up and readmissions

<table>
<thead>
<tr>
<th></th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow up at 7 days (labs)*</td>
<td>21/39 (54%)</td>
<td>21/36 (62%)</td>
<td>0.7</td>
</tr>
<tr>
<td>Follow up within 2 weeks (MD) *</td>
<td>22/36 (61%)</td>
<td>26/35 (74%)</td>
<td>0.2</td>
</tr>
<tr>
<td>Readmitted during treatment</td>
<td>15/47 (32%)</td>
<td>5/37 (14%)</td>
<td>0.049</td>
</tr>
<tr>
<td>Readmitted within 3 months</td>
<td>20/47 (43%)</td>
<td>8/37 (22%)</td>
<td>0.043</td>
</tr>
</tbody>
</table>

*Denominator: eligible patients.
## RETURN ON INVESTMENT

<table>
<thead>
<tr>
<th></th>
<th>% Patients Readmitted</th>
<th>Admissions / Month*</th>
<th>Average LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre intervention</td>
<td>43%</td>
<td>3.2</td>
<td>14 days</td>
</tr>
<tr>
<td>Post intervention</td>
<td>22%</td>
<td>1.7</td>
<td></td>
</tr>
</tbody>
</table>

| Cost - Physician FTE (2/8)                                      | ($43,849) |
| Potential Admissions Avoided / Yr                               | 18        |
| Potential Admission Days Avoided / Yr**                         | 252       |
| Cost Savings (if only regular bed days avoided – would be higher for higher level of care) | $428,400 |
| Cost savings – cost physician                                   | $384,551  |
| Return on investment                                             | 89%       |

*Assume 90 patients per year

** Hospital day cost 1700$
WHERE ARE WE GOING?

Program was transiently discontinued pending resolution of funding issues. There was a proposal to create a position for an ID physician to supervise the process and was submitted to the hospital directives.

CONCLUSIONS

• ID physician direction
  • Decreased complications and readmission
  • Cost-effective and cost-saving
  • Improved quality and patient safety

• Most complications could be managed as outpatient

• Process was initially labor intensive but rewarding

• Further improvement is required for patients with less prolonged hospital stay.
Thank You