Cardiac Intensive Care on a Shoestring budget

Gabriel Cassalett, MD
Pediatric Intensivist
Clínica Shaio
Bogota, Colombia
In the 80s the ICU cost was 8% of total hospital expenses.

At present time the ICUs are the most expensive part of any hospital, and can consumes up to 30% of the total hospital expenses in the USA.
In Colombia

• The Colombian government expends in health maintenance programs US $ 500.00 habitant/year.
• The minimum wage in Colombia is US $ 250.00/month
In the world

• Rationalization of costs is imperative, and cost containment measures have to be implemented in our ICUs, specially in not rich countries to continue giving good care to our cardiac patients with our limited resources.
Utilization of resources

Efficiency

Quality

Low
Neutral
High

Low
Neutral
High

Optimum
Quality in CICU

- Structure
- Process
- Consequence
Quality

STRUCTURE
Are the resources and technologies that have been configured to give care.

*It is no equivalent to quality*
Quality

PROCESS
It refers to how the care is given, how do you measure de physiologic variables, how are drugs administered, how are the procedures done.
Quality

CONSEQUENCE
Is the final anticipated result, that presumably must be positive, like relieving the suffering or pain, increase in life expectancy or to survive a potentially fatal event.
Quality

• COMPLICATIONS
  - Nosocomial infections
  - Accidental extubations
  - Accidental catheters pulled out
  - Endotraqueal tube obstructions
  - Number of events related to the monitoring devices
Costs in CICU

- **Fix costs**
  Are those that independent of usage. (salaries, utilities)
- **Variable costs**
  Are those that change with patient volume. (pharmaceutical supplies)
Fix costs in CICU

1. Personnel
2. Equipments
3. Maintenance
4. State
5. Disposables
6. Education
## Costs in ICU (1989-90)

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>US $</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDICAL SALARIES</td>
<td>163</td>
<td>26.8</td>
</tr>
<tr>
<td>NURSES</td>
<td>353</td>
<td>58.0</td>
</tr>
<tr>
<td>NON-MEDICAL PERSONNEL</td>
<td>9</td>
<td>1.5</td>
</tr>
<tr>
<td>STATE DEPRECIATION</td>
<td>2.7</td>
<td>0.4</td>
</tr>
<tr>
<td>MAINTENANCE (BUILDING)</td>
<td>3.8</td>
<td>0.6</td>
</tr>
<tr>
<td>DEPRECIATION AND MAINTENANCE MEDICAL EQUIPMENT</td>
<td>20.3</td>
<td>3.3</td>
</tr>
<tr>
<td>NON-DISPOSABLES</td>
<td>9.4</td>
<td>1.5</td>
</tr>
<tr>
<td>DISPOSABLES</td>
<td>47.0</td>
<td>7.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>608.2</td>
<td>100</td>
</tr>
</tbody>
</table>

## Fix costs in CICU- Shaio

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SALARIES MEDICAL AND NON-MEDICAL PERSONNEL</td>
<td>76.67</td>
</tr>
<tr>
<td>PUBLIC SERVICES</td>
<td>8.6</td>
</tr>
<tr>
<td>MAINTENENCE</td>
<td>3.32</td>
</tr>
<tr>
<td>DISPOSABLES</td>
<td>3.47</td>
</tr>
<tr>
<td>DEPRECIATION OF BUILDING AND EQUIPMENT</td>
<td>7.94</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Variable costs in CICU

1. Pharmacy
2. Radiology
3. Laboratory
4. Ventilation
5. Special technology
Variable costs in CICU
Preparation of drugs

<table>
<thead>
<tr>
<th>ANTIBIOTICS</th>
<th>TOTAL # DOSIS TMT</th>
<th>COSTS W/O PREP</th>
<th>COSTS W PREP</th>
<th>SAVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>OXACILIN</td>
<td>32</td>
<td>$12,000</td>
<td>$10,500</td>
<td>12.5 %</td>
</tr>
<tr>
<td>GENTAMICIN</td>
<td>4</td>
<td>$3,600</td>
<td>$2,700</td>
<td>25 %</td>
</tr>
<tr>
<td>VANCOMICIN</td>
<td>40</td>
<td>$172,680</td>
<td>$120,876</td>
<td>30 %</td>
</tr>
<tr>
<td>MEROPENEM</td>
<td>40</td>
<td>$726,400</td>
<td>$363,200</td>
<td>50 %</td>
</tr>
<tr>
<td>CEFAZOLIN</td>
<td>12</td>
<td>$27,600</td>
<td>$11,500</td>
<td>58 %</td>
</tr>
<tr>
<td>AMIKACIN</td>
<td>10</td>
<td>$75,000</td>
<td>$22,500</td>
<td>70 %</td>
</tr>
<tr>
<td>AMPICILIN</td>
<td>30</td>
<td>$201,000</td>
<td>$50,920</td>
<td>74 %</td>
</tr>
</tbody>
</table>
Variable costs in CICU
Preparation of drugs

<table>
<thead>
<tr>
<th></th>
<th>W/O PREPARATION</th>
<th>W PREPARATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVOSIMENDAN</td>
<td>US $ 1.200</td>
<td>US $ 200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For patients less than 10 kilos</td>
</tr>
</tbody>
</table>
## Costs in CICU

time expend in preparation of drugs

<table>
<thead>
<tr>
<th></th>
<th>NURSING</th>
<th>PHARMACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAILY PREPARATION TIME</td>
<td>1.3 MINUTES IN PREFILLED SYRINGE WITH ANTIBIOTIC</td>
<td>0.5 MINUTES IN PREFILLED SYRINGE WITH ANTIBIOTIC</td>
</tr>
<tr>
<td>TOTAL TIME EXPENDED PREPARING DRUGS</td>
<td>1725 MIN = 28 HOURS = 1.2 DAYS = 4 WORK SHIFTS OF 6 HOURS DAY</td>
<td>663 MIN = 11 HOURS = 0.5 DAYS = 2 WORK SHIFTS OF 6 HOURS DAY</td>
</tr>
</tbody>
</table>

NURSING TIME SAVED 45%
 Costs in CICU

Reduction of costs

• Fast track?

A Systematic Review of the Safety and Effectiveness of Fast-track Cardiac Anesthesia


In conclusion, this systematic review found no evidence of increased mortality or morbidity rates with FTCA techniques using lower opioid dose regimens when compared with traditional high-dose opioid techniques. Because of the known cost benefits of FTCA combined with concomitant changes in operating room scheduling and ICU nurse staffing,
Costs in CICU

Reduction of costs

- Fast track
  Reduces variable costs, but the fix costs are the same (nurses, doctors, building, public services, etc.).
  It has the benefit of increasing the rotation of beds in the ICU, reduces the risk of nosocomial infections (wound and related to mechanical ventilation)
Costs in CICU

Reduction of costs

Physician-attributable Differences in Intensive Care Unit Costs
A Single-Center Study

Allan Garland, Ziad Shaman, John Baron, and Alfred F. Connors, Jr.

Conclusions: There are large differences among intensivists in the amount of resources they use to manage critically ill patients. Higher resource use was not associated with lower length of stay or mortality.
Reduction of costs in CICU

- Avoid unnecessary exams (routine daily chest X-Rays, daily laboratory work out, unnecessary arterial blood gases)
- Develop general management guidelines for the most common pathologies
Reduction of costs in CICU

- Protocols for most frequent procedures
- Protocols for the preparation of some non-emergency drugs
- Preparation of drugs in the pharmacy in single dosages.
- Reduce waste.
Cost effectiveness

Kahn, JM. Curr Opin Crit Care 2006;12:399-404
We are not rich enough to buy cheap goods.

Abood Shaio
Cardiac intensive care can be done on a shoestring budget