

How to Implement QI in Perfusion Utilizing the EMR



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Disclosures

- The presenter has no conflicts of interest



History

Electronic Medical Record

- Most perfusion teams utilized EMR built by our pump manufacturers
 - EMR can be basic
 - Limited ability to customize (must be within original framework)
 - Framework may have become an unsupported operating systems, (Foxpro/JoCap)
 - Most EMR were centered around adult perfusion



History

Electronic Medical Record

- Most perfusion teams utilized EMR built by pump manufacturers cont.
 - Some do not have the ability to querying data, or may pose an inability for the individual institutions to run queries (languages/JoCap)
 - Do not have the ability to connect/communicate with Epic (manually uploading charts into epic via media manager PDF)
 - Reagor, J. A. Dedicated Perfusion Electronic Medical Record with Discrete Epic Integration. JECT 2017;49:291-298
 - Epic's inability to work with us to make a perfusion page (no outlook for perfusion specific module, anesthesia only record)
 - Steffens, T. Perfusion Electronic Record Documentation Using Epic Systems Software. JECT 2015;47:237-241



Introduction

- We started to look at different EMR options due to previously stated limitations
- Top Five requirements for new EMR
 1. Tech support for system
 2. Ability to run queries (QI), ?? On our own
 3. Ability to connect/communicate with Epic
 4. Ability to customize to our specifications
 5. Ability to dump previous data fields into current database (old Jocap charts/SQL)



Introduction

Implementing a new system
Spectrum Medical



Quality improvement??



Quality improvement model

Institute for Healthcare Improvement

- Model for Improvement key principles consist:

- Forming a team
- Setting Aims/Goals
- Establish Measures
- Select Changes
- Test Changes
- Implement Changes
- Spread Changes

www.ihl.org/resources/Pages/HowtoImprove/ScienceofImprovement/HowtoImprove.aspx



Quality improvement model

NCH Perfusion department

- The Plan-Do-Study-Act (PDSA) cycle
 - Framework utilized to test changes in the work setting
 - Plan it
 - Try it
 - Observe the results
 - Acting on what is learned

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Quality improvement model

NCH Perfusion department

- Plan it: **What are we trying to accomplish?**
 - We added two new perfusionists with different levels of experience (4, and 12yrs), almost half of team
 - With this new dynamic we wanted to reduce perfusionist to perfusionist inconsistencies
 - Do any of our inconsistencies support better patient management/outcomes



Quality improvement model

NCH Perfusion department

- Try it: **What do we do differently**
 - Discussed individual management of patients while on bypass with in our protocol.
 - Ex: Heparin management with HMS
 - After this discussion with the team we came up with specific parameters we felt were important for patient management and outcomes on bypass
 - Will these parameters show that a difference in technique yields better patient outcomes



Quality improvement model

NCH Perfusion department

- Observe it: **How do we observe these parameters**
 - Biggest obstacle: build a report to show how each of us manage our cases and what if any differences will we see within these set parameters
 - Utilizing our new EMR to generate a compliance report for every case (sent after every case via email at chart closure)



COMPLIANCE REPORT

Perfusionist	Case Start Time	Bypass Time (total)	Account #
T. Rauloff CCP	2017-05-01 08:18:21	229	629441159

Blood Gas	Range	CDI Time in	CDI Time Out	Stat # out		
pH	7.35 - 7.45	217	95%	12	3%	713
PO2	135 - 45	216	94%	12	3%	613
PO2	80 - 500	220	96%	8	3%	813
PCO2	20 - 28	228	100%	1	0%	00
Hct	30 - 38	228	100%	0	0%	00
Venous sat	70 - 78	172	75%	58	24%	05
Ser	114 - 145		0%		0%	00
iCa	1.0 - 1.4		0%		0%	00
Chloride	80 - 100		0%		0%	00
Lactate	0.5 - 2.2		0%		0%	00

Hct % drop	
1st and 3rd (Distended Hct)	-7%
1st and Last	-14%

HMS	Range	# out total
ACT	< 480	0/7
ESDR	< 6.7	0/9
Fused H2O2	= 0	0

Cerebral O2 Sat	20% change	72 min	between 50-60%	9 min	less than 50%	0 min
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Urine Output	60.0 ml
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Fluid Balance	-383.7 ml
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MAP (patient weight: 17.4 kg)	Duration (minutes)
<= 6kg => 25 mmHg	4
< 15kg => 30 mmHg	104
< 40kg => 40 mmHg	106
> 40kg => 50 mmHg	12

Cardiac Index (L/min/m ²)	Duration (minutes)
0.0 - 0.4	0
0.5 - 1.0	227
1.1 - 2.2	1
2.3 - 3.0	



Quality improvement model

NCH Perfusion department

- Act on it: Do we see differences in our compliance reports
 - During our monthly 1:1/staff meetings we review our compliance reports
 - What procedure was done, was there anything different about the case
 - Review parameters and situations on pump that could cause out of range parameters
 - What actions were taken to address OOR parameters



Cerebral O2 Sat	20% change	0 min	between 50-60%	0 min	less than 50%	0 min
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Urine Output	-16.0 ml	Fluid Balance	-254.96 ml
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MAP (patient weight: 7.8 kg)	Duration (minutes)	Cardiac Index (L/min/m ²)	Duration (minutes)
<= 6kg => 25 mmHg	1	0.0 - 0.4	0
< 15kg => 30 mmHg	19	0.5 - 1.0	21
< 40kg => 40 mmHg	50	1.1 - 2.2	71
> 40kg => 50 mmHg	39	2.3 - 3.0	23

Temperature	Flow (cooling temp: 35°C)	Cardiac Index (L/min/m ²)	Duration Minutes (time below range)
37 - 28		< 1.8	25
28 - 26		< 1.4	0
26 - 24		< 1.0	0
24 - 22		< 0.8	0
22 - 18		< 0.5	0
18 - 0		< 0.5	0



Questions ???

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