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Improving the Quality of Resuscitations in the Pediatric Critical Care Unit Using Video Recordings

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Presenting Author Disclosure Information

I have the following financial relationships discussed in this CME activity:

Research Support from: American Academy of Pediatrics, Section on Critical Care
Small Projects Grant.

I will give a balanced presentation using the best available evidence to support my
conclusions and recommendations.

I do intend to discuss an unapproved/investigative use of a commercial
product/device (Go Pro Hero-8) in my presentation.

Background

- Patient outcomes following cardiac and respiratory arrest are optimized when team communication, leadership and technical skills are at peak performance.
- Pediatric literature shows an association between the use of video review techniques and improvement in:
 - Leadership and communication (Fernandez R, Rogers, SC)
 - Identification of management errors (Oakley, E)
 - Adherence to guidelines (Carbine, DN)
- At SSM Health Cardinal Glennon Children's Hospital (CGCH), video recordings have been demonstrated to be an effective feedback tool during:
 - Neonatal delivery room resuscitation
 - Emergency room: pediatric trauma and medical patient resuscitation

Purpose

- Little data has been published on the use of video recording reviews to improve the care provided in the pediatric critical care unit (PICU).
- The PICU is the site of 1/3 of our hospital's resuscitation events.
- Evaluating resuscitations in the PICU at CGCH has been carried out with:
 - Performing hot and cold debriefs
 - Retrospective review of code documentation and recorded vital signs
 - SpaceLabs central monitoring waveform data review
 - CPR metric reports from Zoll defibrillators
- With this pilot project, we plan to evaluate the use of video recordings for review of resuscitations in the PICU.

Objective

1. Assess the use of portable video cameras to capture resuscitation events to better inform the structured review process for quality improvement.
2. Identify systemic problems and demonstrate improvement in the quality of resuscitation specific to the PICU.

Design

- 6 *GoPro Hero-8* cameras were mounted in 6 of the 18 patient rooms
 - Each with a memory card and battery



Methods

1. Code Blue called (internal to PICU)
2. The unit charge nurse presses the red button on the camera to power on the camera and start the recording
3. At the end of the event, the charge nurse presses the red button to end the recording and power down the device
4. The charge nurse removes the memory card and battery from the camera and replaces it with a new memory card and charged battery
5. The video is saved to an external hard drive and placed in a secured location and the memory card is erased
6. Within one week, the video is reviewed by the PICU event review team and then deleted
7. This information is stored in a safe place for staff privacy

Methods

- The video is reviewed for the following data:
 - Presence or absence of:
 - Code leader
 - Closed loop communication
 - Excess noise affecting resuscitation
 - Timing of:
 - Placement of the backboard
 - Placement of the Zoll defibrillator pads
 - Administration of first dose of epinephrine
 - Any other identified problem

Results

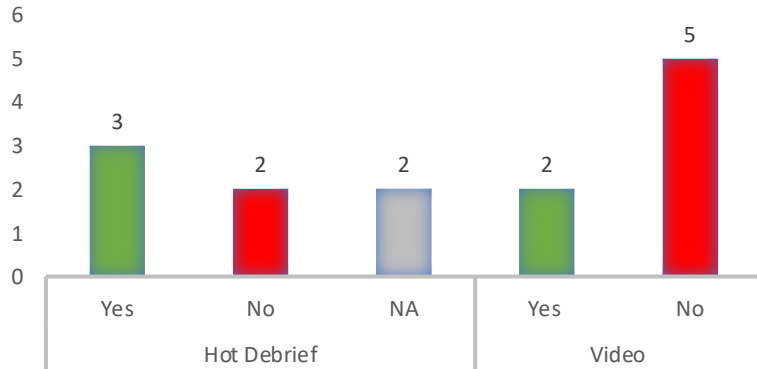
- January 1, 2022- September 3, 2022
 - 8 resuscitation events were captured on video recordings.
 - 7 patients were post-operative cardiac patients
 - 1 of the event captured but unable to review due to technological issues
 - 1 medical patient
 - 14 resuscitations occurred in patient rooms without cameras mounted.

Results

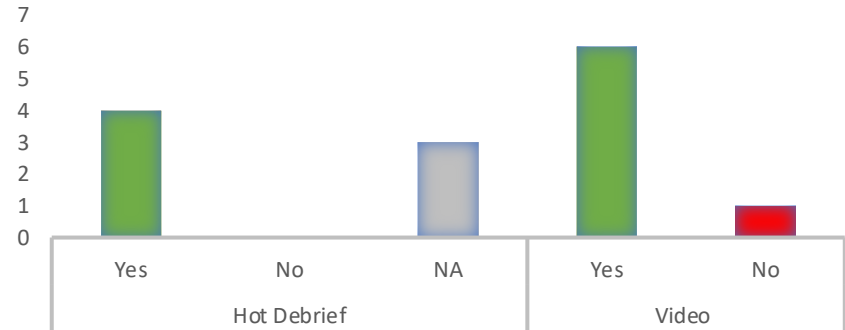
Date of Event	Data from Hot Debrief			Data from Video Review							
	Team Leader	Closed loop communication	Excess Noise	Team Leader	Closed loop Communication	Excess noise present	Time from ECMO request to pager	Backboard in place within 1 minute	Zoll pads in place within 1 minute	Zoll device visible by CPR coach	Time to first dose of epinephrine < 2 min
1/18/2022	Y	Not documented	Y	Y	Y	Y	7 min 12 sec	Unknown	N	Y	Y
1/22/2022		Not documented	N	Y	Y	N	NA (cancelled before)	Y	N	N	Y
1/23/2022	Y	Y	N	N	N	N	3 min 34 sec	Y	N	N	N
4/17/2022	Y	Y	N	N	Y	Y	NA (overhead alert)	N	Y	Y	Y
5/13/2022		Not performed		N	Y	Y	3 min 6 sec	Y	N	N	N
9/2/2022	N	Y	N	N	Y	N	2 min 9 sec	Y	Y	Y	Y
9/3/2022	N	Y	N	N	Y	N	3 min 51 sec	Y	Y	Y	Y

Results

TEAM LEADER



CLOSED LOOP COMMUNICATION



Results

EXCESS NOISE PRESENT

Date of Event	Data from Hot Debrief			Data from Video Review							
	Team Leader	Closed loop communication	Excess Noise	Team Leader	Closed loop Communication	Excess noise present	Time from ECMO request to pager	Backboard in place within 1 minute	Zoll pads in place within 1 minute	Zoll device visible by CPR coach	Time to first dose of epinephrine < 2 min
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1/22/2022		Not documented	N	Y	Y	N	NA (cancelled before)	Y	N	N	Y
1/23/2022	Y	Y	N	N	N	N	3 min 34 sec	Y	N	N	N
4/17/2022	Y	Y	N	N	Y	Y	NA (overhead alert)	N	Y	Y	Y
5/13/2022		Not performed		N	Y	Y	3 min 6 sec	Y	N	N	N
9/2/2022	N	Y	N	N	Y	N	2 min 9 sec	Y	Y	Y	Y
9/3/2022	N	Y	N	N	Y	N	3 min 51 sec	Y	Y	Y	Y

Hot Debrief

Video

Discussion

- These cameras provide useful data in the PICU during resuscitations.
 - There have been many challenges:
 - Events preceding arrest not captured
 - First few minutes of each event not captured
 - Multiple arrests occurred in rooms without cameras
 - Technologic issues occurred: battery issues, recording speed altered
 - Unable to see the monitors clearly

Conclusion

- This pilot study shows that the use of cameras improves assessment of the resuscitation process in the PICU
- Next steps:
 - Investigate automated recording systems
 - Camera installation in all patient rooms
 - Use the trends identified to improve future resuscitations and the review process

References

For more information on this subject, see the following publications:

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