Project Title

Improving the Safety of the External Drainage Monitoring System (EDMS)

Project Lead and Members

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Project members: Theng Li-Ping, Dr Lim Su Lone, Yong Yen-Ling, Smitha Anie John, Christopher Sevilla De Mundo, Dr Oh Han Hoon

Organisation(s) Involved

Ng Teng Fong General Hospital

Healthcare Family Group Involved in this Project

Medical, Nursing

Applicable Specialty or Discipline

Neurosurgery

Project Period

Start date: Nov 2018

Completed date: Feb 2021

Aims

Reduce the incidence of EDMS breakage and malfunction.

Background

See poster attached

Methods

See poster attached

Results

See poster attached

Lessons Learnt

See poster attached

Conclusion

See poster attached

Project Category

Care Continuum

Acute Care, Intensive Care

Care & Process Redesign

Quality Improvement, Quality Improvement

Keywords

External Ventricular Drainage, Patient Safety

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IMPROVING THE SAFETY OF THE EXTERNAL DRAINAGE MONITORING SYSTEM

✓ SAFETY
❑ QUALITY
❑ PATIENT EXPERIENCE
❑ PRODUCTIVITY
✓ COST

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Define Problem, Set Aim

1. External Ventricular Drainage (EVD) is a common neurosurgical procedure performed to treat hydrocephalus. Cerebrospinal fluid (CSF) drains into an **'external drainage and monitoring system' (EDMS).**

2. **Breakage or malfunction of the EDMS** affects patient safety due to compromise of the sterile closed system, resulting in:

   - **Ventriculitis**, a life-threatening condition. Treatment involves a long period of antibiotics or further surgery. The EDMS will have to be replaced.

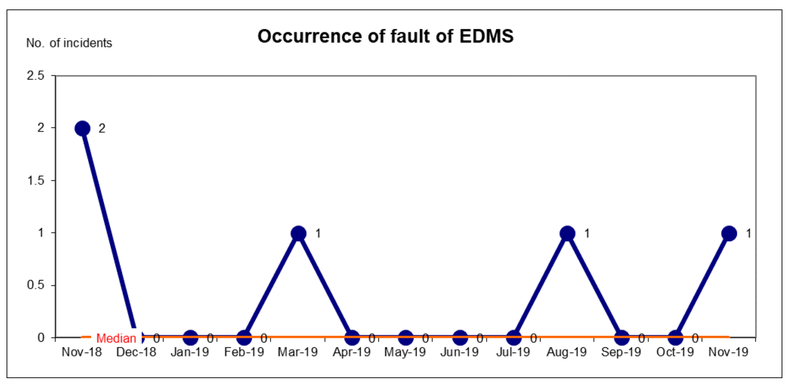
   - **Inadvertant changes in the flow-rate of CSF**, leading to over-drainage or inaccurate charting of CSF drainage volume.

From November 2018 to November 2019, there were 5 cases of hardware malfunction involving the EDMS in current use.

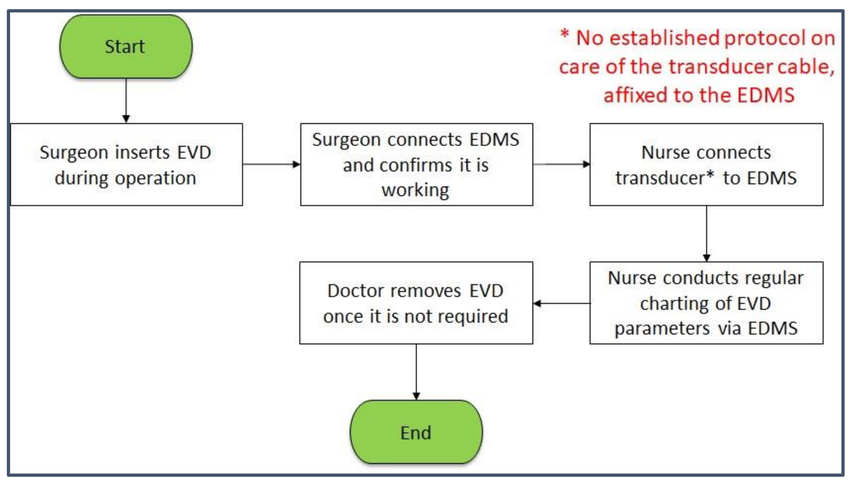
AIM:

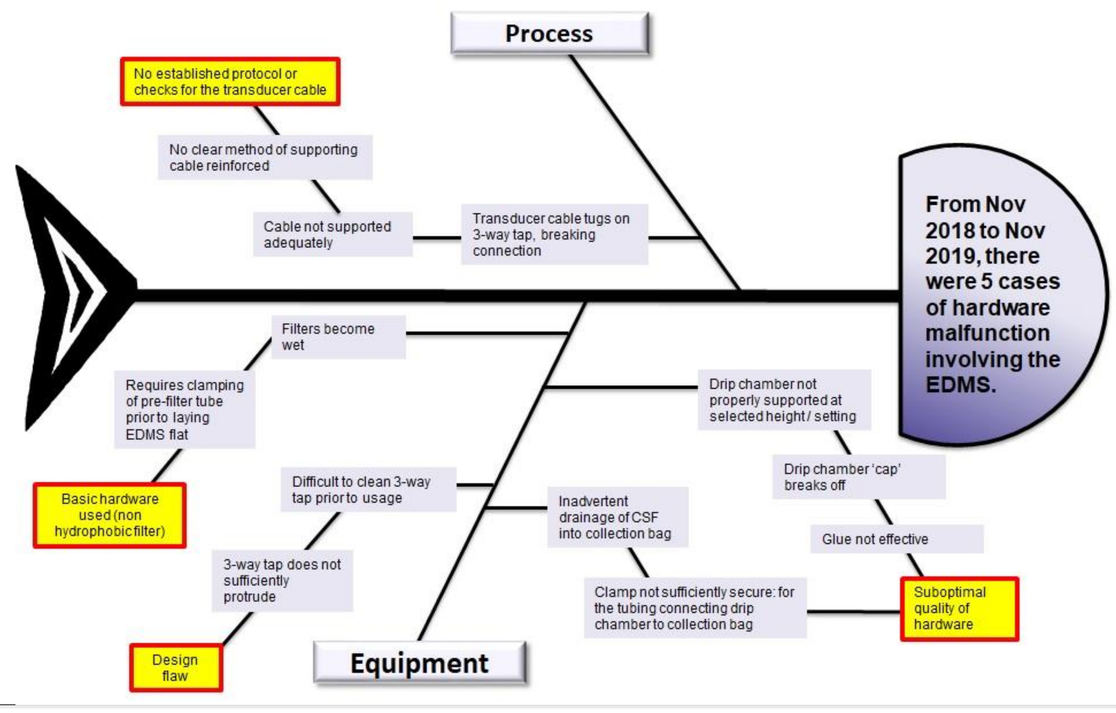
Reduce the incidence of EDMS breakage and malfunction.

Establish Measures



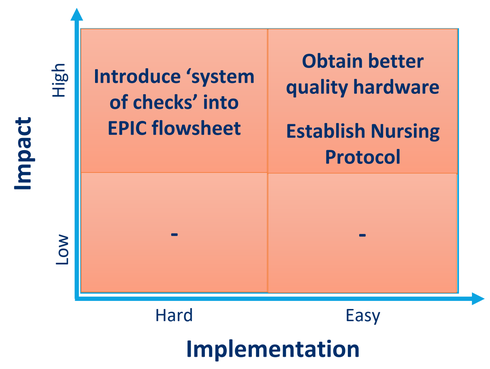
Analyse Problem





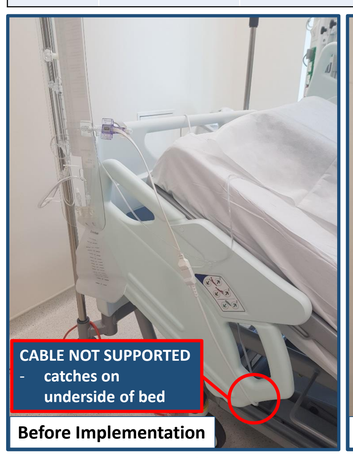
Select Changes

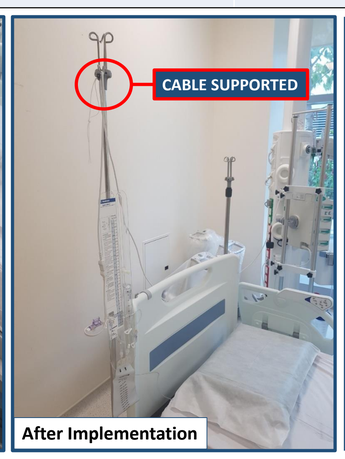
Root Cause		Potential Solutions
Suboptimal quality of equipment (EDMS)	*1*	***Obtain better quality hardware***
No established protocol for checks on the EDMS cable	*2*	***Establish a nursing protocol***
	3	***Introduce a 'system of checks' as part of daily flowsheet***



Test & Implement Changes

CYCLE	PLAN	DO	STUDY	ACT
1	Change the EDMS	New EDMS system with improved specification OT: cheaper Ward: Easier to clean and manage	Less occurrence of failure due to intrinsic equipment issue Unit cost: **cheaper**	Adopt new EDMS as the standard system
2	Establish Care Protocol for the EDMS Transducer Cable	Identified best practices to establish new nursing protocol Conducted training to ICU nurses 'System of checks' via a new parameter introduced into the EPIC flowsheet	NO occurrences of equipment failure due to improper handling Median of 90% compliance in flowsheet Presence of parameter in flowsheet served as a constant and useful reminder to nurses	Adopt new nursing protocol Flowsheet parameter adopted into NGEMR system

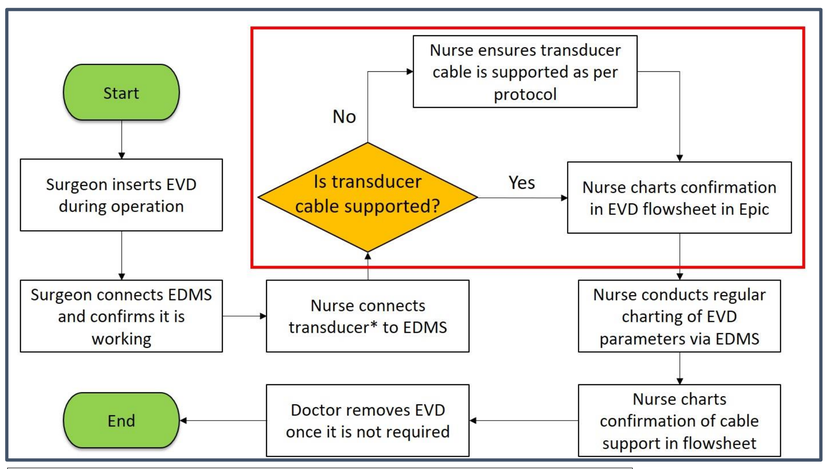


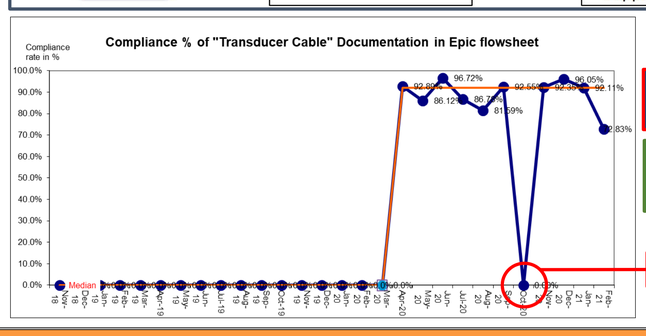


INTRODUCE CARE PROTOCOL FOR TRANSDUCER CABLE

EVD Right Frontal Region	
EVD Properties	Placement Date/Time:
Site Assessment	
Dressing Status	
Dressing Intervention	
Dressing Change Due	
Hourly Total(mls)	2
Cumulative Total(mls)	
CSF Color	Slight blood stained
Height of Drip Chamber (cmH2O)	+10
Oscillating	Yes
ICP monitoring	Yes
Remarks	
EVD Clamp	No
Transducer cable supported	Yes

INTRODUCE CHECKLIST REMINDER IN EPIC FLOWSHEET





Median of 90% compliance during trial period

✓ ZERO nursing care-related EDMS events
✓ Reduction in all-cause EDMS failure

No EVD pts in Oct

Spread Changes, Learning Points

Nursing to continue promotion and compliance with the updated EDMS protocol.

Share updated protocol + EMR documentation with other EPIC-enabled institutions.

***Learning Point:* A multi-pronged approach (hardware, nursing and harnessing available technology – EPIC) allows for effective, long-lasting improvements in the care of the EDMS.**

ZERO nursing care-related EDMS events TO DATE, since start of implentation

Ng Teng Fong General Hospital

Jurong Community Hospital