Taipei Veterans General Hospital

Treat the patients like our own family

Do our utmost to pursue excellence

Reduction of catheter-related bloodstream infections rate in Medical center in Taiwan

Ya-Yun Liu[1] · Li-Jun Lin[2] · Pei-Yi Chen[2] · Shu-Chen Liao[3]

[1,2]RN, Department of Nursing, Taipei Veterans General Hospital, Taipei, Taiwan [3]Hand Nurse, Department of Nursing ,Taipei Veterans General Hospital, Department of Nursing ,Taipei, Taiwan

Background

According to nosocomial infections surveillance reporting system statistical analysis of Centers for Disease Control(C.D.C) in Taiwan, Healthcare -associated infection rate is 7.54‰ at 2103, among them were Bloodstream infection include 76.97%, and there were 49.25% of the patients had to use the central catheter. Index statistics of Taiwan Clinical Performance Indictor also noted ICU central venous catheter-related bloodstream infection rate was 3-5 ‰. US ICUs every year an average of eighty thousand visitors center catheter-related bloodstream infections, not only result in increased antibiotic using, prolonged hospital stay, but also led to high mortality rate of 22.9%. Every central catheter-related bloodstream infection occurred in the case of Taiwan, for an additional cost of medical expenses about 150,000, the days of hospitalization will be extended 16 days. The average catheter-related bloodstream infections rate in our ICU was 11.07‰ from January 2013 to May 2013,even reached up to 21.74‰ in May. Therefore, we hold up a group to decrease CRBSI rate.

Purpose

We designed a project to reduce the CRBSI rate below 4.0‰ in our intensive care unit, further enhance the quality of care of critically ill patients.

Method

Improvement plans from June 2013 to December 2104，causes of infection included health care workers inadequate CRBSI prevention practices, dressing sterilization step was incorrect, needle puncture site was easy to oozing and implantation and dressing materials without homogenization and dispersed. Improvement plans included providing in-service education, establishing standard procedures of central venous catheter insertion and dressing, used chlorhexidine-impregnated sponges, added CVC bundle car and CVC care checklist.

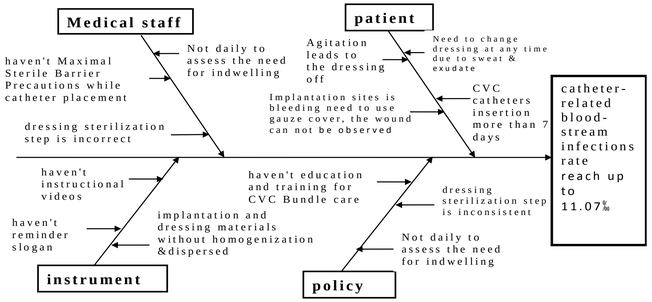

Fig. 1 Causes & Effects Chart of catheter-related bloodstream infections rate reach up

Problems	Countermeasure	feasibility	Economy	Benefit	outcome	Selected
1.health care workers inadequate CRBSI prevention practices	1-1 held education and training courses	15	15	13	43	◎
	1-2 Production CVC Bundle Care teaching video files	15	15	13	43	◎
	1-3 Specification compulsory courses	9	11	11	31	
	1-4 Please IT units set up more than 7 days of catheter reminder program	11	13	11	35	
	1-5 Production of central venous catheter Cue Cards	13	15	9	37	◎
	1-6 Production catheter and dressing processes licensing legislation	15	15	9	39	◎
2.dressing sterilization step is incorrect	2-1 Recording Center catheter dressing change process video files	15	15	15	45	◎
	2-2 Dressing sterilized was standardization	15	15	13	43	◎
3. needle puncture site was easy to oozing	3-1 used chlorhexidine-impregnated sponges	15	11	13	39	◎
	3-2 used Tegaderm & Gauze to fixed catheter	11	13	9	35	
4.implantation and dressing materials without homogenization and dispersed	4-1 Additional CVC Bundle car	15	15	15	45	◎
	4-2 Heparin、Xylocaine placed in CVC Bundle car	9	13	9	31	

Talbe.1 Countermeasure Matrix Diagram

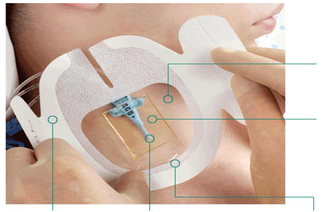

Fig.2 chlorhexidine-impregnated sponges

Fig.3 Production of central venous catheter Cue Cards

Fig.4 CVC bundle car

Fig.5 Specification compulsory courses

Item	Before project (n=13)		After project (n=25)	
	Executed correctly	Correct rate (%)	Executed correctly	Correct rate (%)
1. Dr. did wash their hands before insertion catheters	11	84.6	24	96
2.Dr. did wear caps and masks	8	61.5	24	96
3. use alcohol to clean the skin and then use tincture of iodine sterilization(sterilization range is diameter≧20cm, and wait 2 minutes or until liquid was dried)	5	38.4	22	88
4.Dr. proper wear sterile gowns and gloves	13	100	25	100
5. laying maximum sterile surface (sterile treatment towels of patients with whole body)	11	84.6	23	92

Talbe.2 Central catheter placement Checklist

Item	Before project (%)	After project (%)
1. dressing sterilization step is incorrect	72.9%	6.3%
2. need to change dressing at any time due to sweat & exudate	66.8%	12.5%
3. Implantation sites is bleeding need to use gauze cover, the wound can not be observed	56.2%	12.5%
4. Placement&dressing materials without homogenization and dispersed	56.2%	18.8%
5. repeatedly used dressings induce skin fragile and easily broken & redness	47.9%	20.8%
6. needle puncture site difficult to remove blood clotting	33.3%	20.8%
7. needle puncture site difficult to fix	22.9%	18.8%

Table.3 Central catheter dressing process Checklist

Item	Before project (n=30)		After project (n=65)	
	Executed correctly	Correct rate (%)	Executed correctly	Correct rate (%)
1. properly wash their hands before implement of central venous catheter care	29	96.6	63	96.9
2. properly wear caps and masks	30	100	65	100
3. properly implementation of central venous catheter care(use alcohol to clean the skin and then use tincture of iodine sterilization with cyclic, sterilization range is diameter ≧ 10cm, and wait 30 seconds or until liquid was dried)	12	40	60	92.3
4. Dressing appropriately ＊no bleeding, exudate: use transparent thin film dressing ＊have bleeding, exudate：use gauze & transparent thin film dressing to pressur	26	86.7	63	96.9
5. confirm catheter indwelling is/isn't necessity	15	50	61	93.8

Table.4 After catheters nurse care Checklist

Results

The CRBSI rate was decresed to 0.74‰ after implementation.
This was significantly below the reduction target of 4.0‰.
Even had 10 month of zero infection rate, significantly reduced catheter-related bloodstream infections in our ICU.

Fig.6 2013~2014 CRBSI rate run chart

Conclusions

Reduce central catheter-related bloodstream infections is a major issue in hospital. We read the most relevant literature countermeasures more similar projects, so we participated in relevant seminars and joined chlorhexidine-impregnated sponges program. This project has effectively reduced CRBSI.
This experience was shared to help other hospitals and improve quality of critical care units, reduce the number of days of hospitalization and cost of medical expenses.

Reference

1.O'Grady, N. P., Alexander, M., Burns, L. A., Dellinger, E. P., Garland, J., Heard, S. O., ... & Saint, S. (2011).Guidelines for the prevention of intravascular catheter-related infections. Clinical Infectious Diseases, 52(9), e162-e193. doi:10.1093/cid/cir257

2.Timsit, J. F., Schwebel, C., Bouadma, L., Geffroy, A., Garrouste-Orgeas, M., Pease, S., … &Luct, J. C. (2009).Chlorhexidine-impregnated sponges and less frequent dressing changes for prevention of catheter-related infections in critically ill adults: a randomized controlled trial. Journal of the American Medical Association, 301(12), 1231-1241. doi: 10.1001/jama.2009.37