Handbook On Nursing Procedures

शरीरमाद्यं खलु धर्मसाधनम्

NEURO SCIENCES CENTRE
ALL INDIA INSTITUTE OF MEDICAL SCIENCES
NEW DELHI

(First Edition)

"**As a nurse**, we have the opportunity to heal the heart, mind, soul and body of our patients, their families and ourselves. They may not remember your name but they will never forget the way you made them feel."

Maya Angelou

First Edition

NIE, NSC

Standard Operative Protocol on Central Venous Catheter Care Surgical Scrubbing Suctioning Technique

Compiled by
Pushpa
Rekha Pradhan
Anjali Devi. M
Sweety
Preety Sharma

First Edition

NIE, NSC

Acknowledgments

We wanted to thank each one of you who ever contributed for this first ever standard operative procedural booklet.

We're humble and grateful to our Chief of NSC Dr. Padma Srivastava, who forwarded the letter to the HOD's to nominate the quality improvement mentors and much obliged for supporting neuro nurses with constant effort. Than you ma'am.

It is hard to find words to express our gratitude to the AMS Dr. I. B. Singh who acknowledged and permitted this SOP for printing work. Thank you sir.

We're touched and grateful to Mrs. Ranjit Kaur, who went above and beyond. Thank you for all you have done.

Thank you so much for all the nursing fraternity of NSC for your constant support.

We would like to take this opportunity to thank all the HOD's of NSC (Dr. S. S. Kale, Dr. Arvind Chaturvedi and Dr. S. B. Gaikwad) for taking time out of your busy day to nominate the internal QI mentors.

We're greatly appreciate the faculties who have had validated the content of this booklet with their vast subject knowledge and experience.

We're really so amazing to work with quality mentors in such a positive guidance and support for our quality improvement projects. Thank you so much.

Thank you to each one of the QI team members for completing the project with in a time frame. we appreciate the co-operation that everyone displayed under such strenuous condition which made the workflow simple and easy. We're glad that we've team like you. Looking forward to the next project.

Foreword Message from the Chief

Prof. M V Padma Srivastava
MD, DM. FRCP (Edin), FAMS, F.N.A.Sc., FIAN
Professor, Head Deptt. of Neurology
Chief Neurosciences Centre, AIIMS
Hon.Professor, UCLAN, U.K.
Awarded Padma Shri by
President of India
Year -28th March 2016

- Bettering clinical outcomes following medical intervention not only depends on evidence-based best medical / surgical management but also on evidence-based infection control practices and nursing care. Often neglected, over-looked, taken-for-granted and glazed over aspects in health-care delivery systems are the nursing and infection control practices. Quintessentially, these two can make or break the eventual outcome in a patient for better or worse! No amount of super evolved surgical or medical techniques can alone be the reason for patient improvement if after care is ignored.
- In Stroke medicine, we often say that "thrombolysis" of a blocked artery is the most glamorous part of Stroke care. But, it is the Stroke Unit care with its multi-disciplinary team who is aware of and prempts the post stroke complications, recognizes early and manages optimally which leads most significantly to great outcomes!
- I congratulate the authors, Anjali Devi, Sweety, Rekha Pradha and Pushpa for this amazing and exemplary work. I also congratulate and put on record my appreciation to Mrs. Ranjit Kaur, NS, NSC for her outstanding leadership.

Foreword Message from the AMS

Its of great pleasure and satisfaction to find that nurses of neuro sciences centre, AIIMS are bringing out the proceedings of Standard Operative Protocol on Central Venous Catheter Care, Surgical Scrubbing and Suctioning Technique which replete with specialised nursing care concepts for neuro patients. The proceeding brought out in the form of a booklet symbolises the success of the “continuous nursing education programme” which they had initiated with tremendous hardship at the beginning. Now the CNE will keep on encouraging the nursing community to update their knowledge and generate research temper in them.

Dr. I. B. Singh
Prof. Hospital Administration
Addl. Medical Superintendent
Cardio Neuro Centre
AIIMS, New Delhi

Foreword Message from Nursing Superintendent

I Feel proud to release this booklet of standard operative protocols book for the uniformity in carryout nursing care. I hope this booklet will grab the nurses attention to do their work with interest and hoping that this initiation will help the nurses to promote the nursing practice to meet the level.

Mrs. Ranjit Kaur
Nursing Superintendent, NSC
AIIMS, New Delhi

Team Leader's Message (CVC CARE)

- "Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution".
- This moment is of utmost gratification and very delightful to release the first ever edition of handbook entitled "Quality Improvement and Central Venous Line Care" of Neuroscience Centre, AIIMS, New Delhi
- These guidelines have been prepared according to standardize the protocol and it also incorporates CDC and WHO guidelines. Nursing care demands utmost precision of various skills which are required for effective central venous line care. I am confident that this handbook will bring various useful clinical practices in CVC care and will provide a tool for nurses and other health care staff for better patient care forever. I wish and I am sure that this handbook will go a long way in educating and making nurses involved in patient care with strong foundation of knowledge. Suggestions and recommendations are welcomed to supplement our knowledge for betterment of patients and for development of one of most important asset of our organization.

Ms. Sweety Lohchab
Nursing Officer
NICU,
AIIMS, New Delhi

Team Leader's Message (Scrubbing Technique)

Scrubbing is much needed defence against the spread of surgical infection. With a proper regimented surgical scrub protocol and the proper use of various antiseptics we can minimize surgical site infections. standard operative protocol helps or personnel to understand the need of competency and the proper techniques in surgical scrubbing.

Mrs. Rekha Pradhan
Senior Nursing Officer,
NSOT, AIIMS, New Delh

Team Leader's Message (Suctioning Technique)

Suctioning clears mucus from the endotracheal / tracheostomy tube and is essential for proper breathing. Secretions left in the tube could become contaminated resulting in chest infection and tube block. Therefore Airway management is a priority for nurses. The how and when of endotracheal / oral suctioning must be mastered in order to ensure the patient's patent airway. Though suctioning can be life saving, improper use & technique may cause serious complications and worsen a patient's condition. Employing correct and rapid techniques and using quality equipment are vital in airway management of patient's in both pre-hospital and hospital settings. A SOP therefore can be the turning point in annulling the mortality and morbidity.

Ms. Pushpa
Senior Nursing Officer
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Nurse Educator

- We have strived to develop the Standard Operative Procedure (SOP) booklet for Central Venous Catheter (CVC) care, Scrubbing Technique and Suctioning technique with an intention to provide uniform nursing care in Neuro Sciences Centre (NSC), AIIMS New Delhi. The main purpose of this SOP booklet is to follow the results after the Quality Improvement Projects (QIP) on the above said procedures in Neuro Surgery Intensive Care Unit (NSICU-C), Neuro Surgical Operation Theatre and Neurology ward (NS4). This procedural booklet compiled and edited after the experts of faculty's validation and review . The prime motto of this booklet is trying to set the trend on better and uniform nursing care.
- I feel very grateful to have an opportunity to work as a Neuro nurse under the leadership of Mrs.Ranjit Kaur, who let me to explore apart from the routine work.

Anjali Devi .M
Nursing Officer
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Quality Improvement Coach

Continuous Quality Improvement is a science of identifying problems in the system and putting efforts to improve the processes by a team of people who are involved in that process and sustain the improvement in the system and thus developing a culture of safety. I congratulate all the dedicated care providers who have felt the need as per their assessment and worked in teams to improve various processes like CVC care, Scrubbing technique and Suctioning technique. As a result, they have come up with the protocol for the same which is a very right way to sustain the gain. Once again congratulating the sincere efforts of all involved.

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Standard Operative Protocol on Central Venous Catheter Care

Neuro Surgical Intensive Care Unit - C
Neurosciences Centre
AIIMS, New Delhi

First Edition

NIE, NSC

SOP on Central Venous Catheter Care

BACKGROUND

Quality improvement initiative was carried out for reducing the number of "Central Line Associated Blood Stream Infections" in Neurosurgery ICU-C of Neurosurgery Department, NSC, AIIMS, New Delhi. The objective was to reduce the incidence of central line associated Blood Stream infections among patients admitted in Neurosurgery ICU-C, as a result of the QI initiative a SOP was developed by the team, validated by experts and implemented in the NS-ICU.

SCOPE

The doctors and nursing personnel are responsible for the care of CVC and it is applicable for all the patients who has CVC in-place.

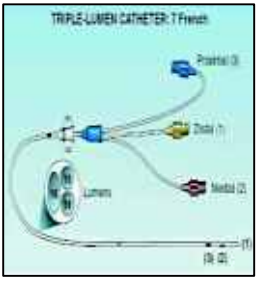
INTRODUCTION

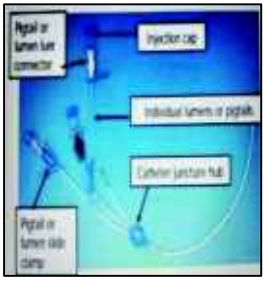
- A catheter (tube) that is passed through a vein to end up in thoracic (chest) portion of the vena cava or in the right atrium of the heart.
- Permits monitoring of special blood pressures including CVP, Pulmonary Artery Pressure and PCWP (Pulmonary capillary wedge pressure).

INDICATIONS

- Redness, tenderness, drainage, warmth or odour around the catheter site
- Leakage of blood or fluid at the catheter site or the cap
- Resistance while flushing the catheter
- Displacement or lengthening of the catheter

PARTS OF CENTRAL VENOUS CATHETER





Process for CVC Care

1. Hand hygiene compliance while handling CVC.

2. Maintain 100% sterility before and throughout CVC handling.

3. Assessment of CVC insertion site in each shift for its intactness, suturing and signs of infections like redness, swelling, leakage, indurations and exudates. Document the findings.

4. Change transparent tegaderm dressing and label at least every 7 days or sooner if:

   - Dressing is not intact
   - Any signs of inflammation
   - Excessive accumulation of blood or moisture under dressing

5. Prefer gauze dressing over transparent dressing, if patient is diaphoretic, site is bleeding and oozing.

6. Change gauze dressing over CVC ports every 24 hours or whenever loose, moist or soiled.

7. Do not use any antibiotic cream or organic solvents (e.g. Acetone or Ether) on insertion site.

8. Check for patency, backflow and flushing of CVC ports with normal saline once in every shift if patient is not on continuous IV therapy and document it.

9. Unused CVC ports must be clamped to prevent air embolism and backflow of blood.

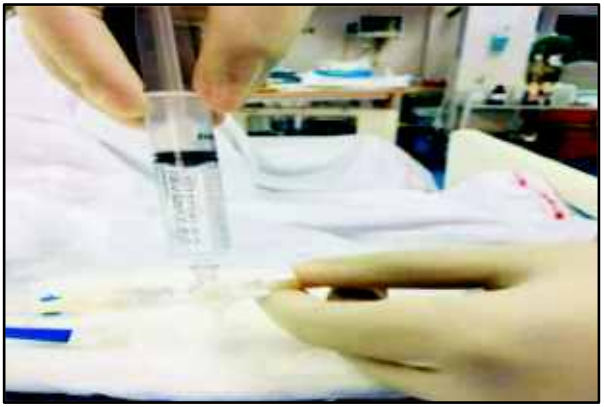
10. Fluid administration sets (burettes, infusion lines, multi-flow adapters, extension lines) attached to CVC should be changed in every 24 hours and remove unnecessary lines.

11. Change blood product set every 4 hourly. (Exception only for PRBC set if it is used for continuous transfusion one after other for up to 4 packets if not visibly clotted).

12. TPN and lipid emulsion administration sets has to be changed with each infusion.

13. Prime the IV sets, three way adapter and infusion line prior to attaching the CVC. Use the below mentioned technique to trap air bubble in CVC.

14. While administering any medication hold the syringe in 90° angle with CVC port that helps to trap air bubble at the piston part of the syringe.



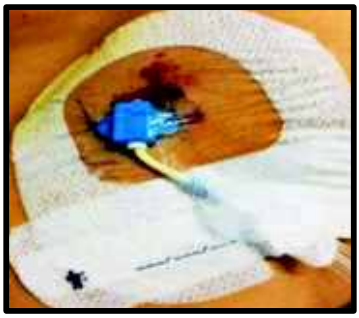
15. While priming the three way, open all ports to prevent any trapping of air bubble.

Articles required for CVC Care

- A Pair of Sterile Gloves
- Transparent Dressing (Tegaderm)
- Disposable Syringe (10ml)
- 70% Alcohol
- Spirit Solution
- Normal Saline
- Sterile gauze pad
- Adhesive tape
- A Three way
- Intravenous sets (as required)

Procedure of CVC Dressing

1. Assess the need for dressing.
2. Arrange all articles required to change dressing at patient's bed side.
3. Explain procedure to the patient.
4. Perform hand hygiene.
5. Position patient as required (supine with neck turned towards opposite side of CVC).



6. Put on sterile gloves to peel off old dressing and dispose off the waste.
7. Perform hand hygiene.
8. Put on sterile gloves and place the sterile wrapper of gloves beneath the CVC lumens.
9. Check for any signs of infection

10. Clean CVC insertion site with alcohol swab from centre to periphery.
11. Clean each CVC lumens in one stroke and allow for air dry for 30 seconds.
12. Scrub the hub in circular motion for 10 times with 70% alcohol swabs.
13. Apply transparent tegaderm over the insertion site.
14. Clamp each CVC lines and remove three ways, IV sets and caps except for any Inotropes, vasopressors and other life saving drugs.

15. Scrub the CVC hubs thoroughly for at least 10 seconds.
16. Check for backflow in each lumen and flush it with normal saline.
17. Prime and connect new IV sets, three way adapter and infusion lines and drape the hubs with sterile pad and tap it securely.

19. Discard the clinical waste (plastic waste in red bin, gauze dressing in yellow bin and wrapping covers in black bin).
20. Perform hand hygiene and label the CVC with date.
21. Document in nurse's chart and bundle form.

DO's and DON'Ts for CVC Care

CVC Handling without Gloves

CVC Handling with Sterile Gloves

Unused and unclamped ports with blood in lumen

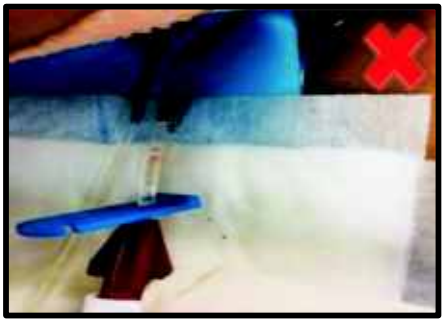
Unused lumens clamped and Flushed

No Stopper at the port

CVC ports secured with Stopper

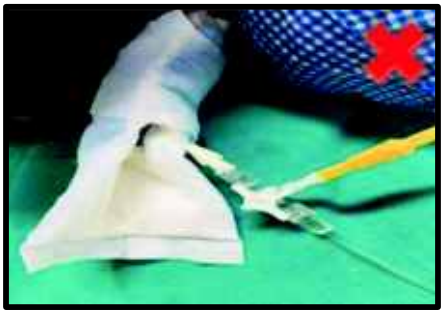
Air in syringe while Flushing

Perpendicular flushing for trapping air



Air in CVC Lumens

CVC Lumens without Air



Insecured and exposed dressing

Secured CVC Ports and Three ways

Recommended changes

CVP Measurement:

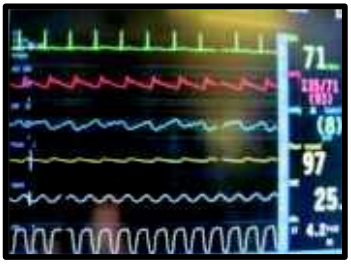
- Circulating blood flows into the right atrium via the inferior and superior vena cava. The pressure in the right atrium is known as Central Venous Pressure (CVP).

Equipment:

A. Manometer:

- CVP is measured using an indwelling central venous catheter (CVC) and a pressure manometer or transducer. Both methods are reliable when used correctly.

B. Transducers:



- Accident and Emergency departments, High Dependency areas and Intensive Care units use transducers for measuring CVPs.

CVP Recording:

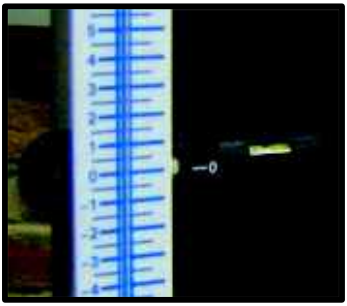
- CVP is usually recorded at the mid-axillaryline where the manometer arm or transducer is level with the phlebostatic axis.
- This is where the fourth intercostal space and mid-axillary line cross each other allowing the measurement to be as close to the right atrium as possible.

Using a Manometer:

1. Explain the procedure to the patient to gain informed consent.
2. If IV fluid is not running, ensure that the CVC is patent by flushing the catheter.

3. Place the patient flat in a supine position, if possible. Alternatively, measurements can be taken with the patient in a semi-recumbent position. The position should remain the same for each measurement taken to ensure an accurate comparable result.

4. Line up the manometer arm with the phlebostatic axis ensuring that the bubble is between the two lines of the spirit level.



5. Move the manometer scale up and down to allow the bubble to be aligned with zero on the scale. This is referred to as 'zeroing the manometer'.

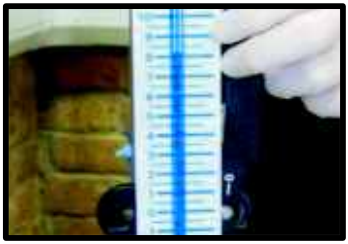
6. Turn the three-way tap off to the patient's side and open to the manometer's side.

7. Open the IV fluid bag and slowly fill the manometer to a level higher than the expected CVP.

8. Turn off the flow from the fluid bag and open the three-way tap from the manometer to the patient.

9. The fluid level inside the manometer should fall until gravity equals the pressure in the central veins.

10. When the fluid stops falling the CVP measurement can be read. If the fluid moves with the patient's breathing, read the measurement from the lower number.



11. Turn the 'tap off' to the manometer.

Using a Transducer:

1. Explain the procedure to the patient to gain informed consent.
2. The CVC will be attached to intravenous fluid within a pressure bag.
3. Ensure that the pressure bag is inflated up to 300mmHg.
4. Place the patient flat in a supine position if possible.

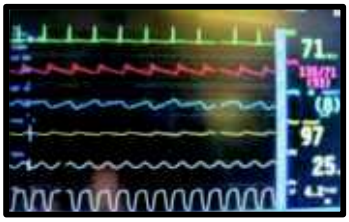
5. Catheters differ between manufacturers. However, the white or proximal lumen is suitable for measuring CVP.

6. Tape the transducer to the phlebostatic axis or as near to the right atrium as possible.

7. Turn the tap off to the patient and open to the air by removing the cap from the three-way port opening the system to the atmosphere.

8. Press the zero button on the monitor and wait while calibration occurs.

9. When 'zeroed' is displayed on the monitor, replace the cap on the three-way tap and turn the tap on to the patient.



10. Observe the CVP trace on the monitor. The waveform undulates as the right atrium contracts and relaxes, emptying and filling with blood. (light blue in this image)

****Special Considerations:**

- If manometer is unavailable, IV set is being used for CVP Measurement, both ends of IV set should be covered with stopper to prevent risk of infection.
- CVP monitoring lines should be changed after every 24 hours.
- Label Date and Time on CVP monitoring line.

Catheter Management:

Flushing / Heparinization:

A. ADULT:

1. Maintain each lumen with heparinised saline 500 units/ml.

B. PEDIATRIC

1. Obtain physician order to include heparin concentration, volume and frequency of flushing.

C. All heparin must be removed from the lumens prior to use. (Follow procedure for blood draw)


Improving compliance to "Aseptic Central line Care and maintenance Bundle" for reduction of central line associated blood stream infections among neurosurgery patients.
Neurosurgery ICU-C, Neuroscience Centre, AIIMS, New Delhi
Introduction
Problem Identified
Smart Aim
Methodology
Baseline Data
Baseline Data
Problem Analysis Tool
Observation Checklist of Central Venous Line Care
Analysis of problem using fish bone analysis
Testing Change Ideas
1st Change Idea: Sensitization of Health care personnel on aseptic handling of central venous line
2nd Change idea: Demonstration of central venous line care procedure using "Aseptic Central line Care and maintenance Bundle"
3rd Change idea: Formulation of booklet on aseptic central venous line care
Results
Sustenance Phase
Compliance to Aseptic Central line Care and maintenance Bundle
Reduction of CLABSIs over a period of time(as per Tip Culture Report)
Conclusions

Standard Operative Protocol on Surgical Scrubbing Technique

Neurosurgical Operation Theatre
Neurosciences Centre
AIIMS, New Delhi

Surgical Scrubbing

Background

Quality **improvement** initiative was carried out for reducing the number of "intra-operative infections" in Neurosurgical Operation Theater of Neurosurgery Department NSC, AIIMS, New Delhi. The aim is to provide a standardized procedure for surgical hand antisepsis. As a result of the QI project, a SOP was developed by the team, validated by experts and implemented in the NSOT, NSC, AIIMS, New Delhi.

Scope

- This policy is to provide guidance to healthcare professionals required to undertake a surgical hand scrub in order to protect the patient from infection during an operation or other invasive procedure.
- It is important for healthcare management to help the health care personnel to understand the cause / effect cycle of surgical scrubs as they relate to infection prevention.

Introduction

- The surgical scrub is a systematic washing of hands and forearms and scrubbing of finger nails using especially developed techniques with the effective antibacterial cleansing agent available, in order to render the hands and arms as free as possible from micro-organisms.
- It is an important procedure to reduce the risk of contamination by micro-organisms during operative procedures to improve patient outcomes.

Objective

- To remove debris and transient micro-organisms from the nails, hands and forearms.
- To reduce the resident microbial count.
- To inhibit rapid inbound growth of micro-organisms.
- The person assigned to scrub for an operation must scrub their hands and arms for a prescribed length of time as described in the procedure prior to donning a sterile gown and gloves.

Definitions

- **'Scrubbing' or 'scrub'** is a term used to describe the process of hand and forearm decontamination required by the surgical team prior to commencing any surgical or invasive procedure.
- **Transient micro-organisms** are those that are introduced onto the skin surface by contact with "soil" (micro-organisms on surfaces) and various other substances from the environment.
- **Resident micro-organisms** are those whose natural habitat is the skin. They comprise gram positive and gram negative bacteria and exist in large numbers under the fingernails, in the deeper layers of the skin such as hair follicles, sweat glands and sebaceous glands.

Principle

- The basic principle of the scrub is **to wash the hands thoroughly, and then to wash from a clean area (the hand) to a less clean area (the arm)** using proper technique to minimize infection.

Types of Method

- **Numbered stroke method:** A method in which certain number of hand strokes is designated for each finger, palm, back of hand, and arm.
- **The Timed scrub:** In timed scrub, each scrub should last from four to five minutes.

Surgical Scrub Preparation

- A surgical hand scrub shall be performed before donning gown and gloves pre-operatively by all personnel performing or assisting with surgical procedures.
- Don a surgical cap and mask. Finger nails should be short.
- Remove jewellery from fingers, arms and forearms.
- Adjust the sleeves of the scrub suit at least four inches above the elbows to prevent them from getting wet.

Pre wash

- Wet hands and forearm. Apply sufficient soap to work up lather.
- Wash from finger tips to three inches above the elbows (no need to follow the scrubbing steps).

Hand Scrubbing Procedure

Step-1

- Wet the hands and forearms

- Apply the antimicrobial solution

- Work the cleaning solution into the hands palm to palm, creating a lather

Step-2

- Rub the right palm over the back of the left and vice versa with the fingers interlaced.

Step-3

- Rub hands palm to palm, with fingers interlaced.

Step-4

- Perform rotational rubbing backwards and forwards with clasped fingers of the right hand into the left palm hand and vice versa.

Step-5

- Perform rotational rubbing of the right thumb clasped in left hand and vice-versa

Step-6

- Rub the fingertips of the right hand on the palm of the left hand and vice versa.

- Continue with **the rotating action down the arms,** working to 3 inches above the elbows.

- Rinse and **repeat steps 1-6** keeping hands raised **above elbows at all times**

- The second wash should only cover **two-thirds of the forearms** to avoid compromising cleanliness of hands

- The scrub procedure should last **for 4-5 minutes.**
- **Rinse** the **hands** under running water, allowing the water to run from **fingertips to elbows.**
- Turn the tap off **with your elbow** and keep **your hands up,** allowing water to drip down from your elbow.
- Proceed to the operating room suite holding hands **above elbows.**
- Pick up **one hand towel** from the top of the gown pack and **step back** from the surface.

- **Grasp the towel and open it** fully and lean your body forward. Do not allow the towel to touch any unsterile object or unsterile parts of your body.
- **Hold your hands** and **arms above** your elbow, and keep your arms **away from your body**

- Holding one end of the towel with one hand **dry the fingers** of the opposite hand using a blotting rotational motion.
- Move to the **dry area** of the towel and continue in this manner down the **forearm** to the **elbow.**

- Ensure you **do not retrace** from the forearm back up to the hands and **do not wipe the** skin dry

Points to Remember

POLICY	RATIONALE
Finger nails must be trimmed short and be free of artificial nails and enhancements.	Short nails are less likely to harbor micro-organisms, scratch the patient or puncture gloves.
Jewellery in fingers and arm should be removed	Micro-organism accumulates in jewellery.
Hands and forearms must be free of open lesions and breaks in skin integrity	These conditions increase likelihood of more micro-organisms residing in skin surfaces
Wet hands and arms by passing them through running lukewarm water.	Excessive hot water is harder on skin and uncomfortable to wash with for recommended amount of time, however cold water prevents soap from lathering properly, germs and dirt may not be washed away.
Rinse in one direction only, from finger tips to elbows. Do not move the arm back and forth through the water.	The tips are considered to be cleaner than elbows. Backflow of water may contaminate the scrubbed area.
Take care not to touch the tap or side of the sink during the procedure. If you accidentally touch the tap or any surrounding objects, you must re-scrub.	The tap and side of the sink are considered to be contaminated.
Wash each side of the arm to three inches above the elbow, keeping hands above elbows at all times.	This helps to avoid recontamination of hands by water from the elbows and prevents bacteria-laden soap and water from contaminating the hands.
If the hands and arms are grossly soiled, the scrub time should be lengthened	Good surgical hand-washing practices are important for infection prevention of surgical site.
During the procedure, care should be taken not to splash water onto OT attire.	Wet surfaces harbor more organisms thus Sterility may be compromised

IMPROVING THE COMPLIANCE OF SURGICAL SCRUBBING TECHNIQUE AMONG NURSING OFFICERS IN NSOT

Rekha, Sudha, Veena P, Vinod, Anjaly, Joan, Anu, Veena L, Marina

INTRODUCTION

- The surgical scrub is an important procedure to reduce the risk of contamination by micro-organisms during operative procedures.
- A surgical hand scrub shall be performed before gowning and gloving pre-operatively by all personnel performing or assisting with surgical procedures to remove debris and transient micro-organisms from the nails, hands and forearms.
- The basic principle of the scrub is to wash the hands thoroughly, and then to wash from a clean area (the hand) to a less clean area (the arm) using proper technique to minimize infection

PROBLEM IDENTIFIED

- Low Compliance of Surgical Scrubbing Technique

AIM STATEMENT

- To Improve the compliance of surgical scrubbing technique among nursing officers in NSOT from 40% to 70% within a period of 2 months. (Starting from 20.05.2019)

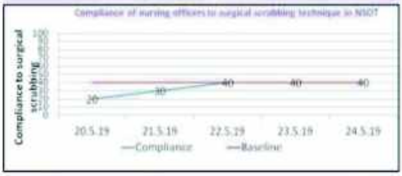
METHODOLOGY

Improvement was carried out by using POCQI model

Method of testing:

Direct Observation - Morning shift, 1st case, 5 person

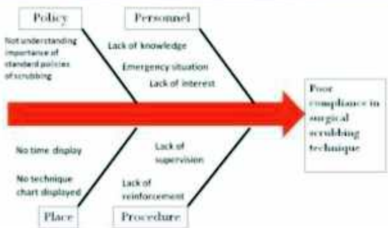
Baseline Data



Checklist for Hand Scrubbing Technique

Date	Person	Pre-wash	1st wash (3" above elbow)	2nd wash upto mid-arm	Rinsing No backflow (elbow to hand)	Wiping (single stroke)

Root Cause Analysis (Fish Bone)



TESTING CHANGE IDEAS

- 1st Change idea: STP with demonstration
- 2nd Change idea: Scrubbing technique poster displayed
- 3rd Change idea: Digital clock fixed above the scrubbing station
- 4th Change idea: Constant supervision by ANS
- 5th Change idea: SOP was formulated for the uniform procedure and to maintain the sustenance

Sustaining Improvement

- Indirect observation
- Repeat demonstration teaching class quarterly for 6 weeks and monthly afterwards.
- Continuous supervision

RESULTS

CONCLUSIONS

- Compliance to surgical scrubbing among nursing officers have markedly increased following the adoption of change ideas.
- It helped the staff to understand the importance of standard method of surgical scrubbing.
- Sustenance phase has maintained 80% compliance to surgical scrubbing technique.

Acknowledgement

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Standard Operative Protocol on Suctioning Technique

(Endo-tracheal, Tracheostomy, Oral and Nasal suction)

NS 4 Ward
Neuroscience Centre
AIIMS, New Delhi

Abbreviation

- SOP -Standard Operating Protocol
- ICU - Intensive Care Unit
- HDU- High Dependency Unit
- Fr- French
- AMBU- Artificial Manures Breathing Unit
- ET- Endotracheal
- TR-Tracheal
- CPAP -Continuous Positive Airway Pressure
- + (Mild secretion)
- ++ (Moderate secretion)
- +++(Excessive secretion)
- NS1-Normal saline bottle specifically for Endotracheal or tracheal suction
- NS2 - Normal saline bottle for oral suction
- NS 3- Normal saline bottle for disinfectant (1% sodium hypochlorite) the suction tube

Preface

Effectivs suctioning is an essential aspect of airway management in the critically ill patients with many associated risks and complications. These ranges from trauma and hypoxemia to cardiac dysrhythmias and, in extreme cases, cardiac arrest and death. In order to improve standards of care, it is imperative that nurses are aware of current research recommendations. This will enable nurses to make informed decisions about their own suctioning practices, based on the individual needs of the patient.

Background

Quality improvement initiative was carried out for reducing the number of "hospital acquired infections and aspiration pneumonia" in Neurolgy ward (NS4) of Neurogy Department NSC, AIIMS, New Delhi. The aim is to provide a standardized procedure for Suctioning Technique. As a result of QI initiative, SOP was developed by the team, validated by experts and implemented in the NSC.

Scope and Benefit

This SOP serves as a reference toolkit for all registered nursing officers working in HDU / ICU / WARD and to all involved in the assessment and delivery of suction techniques to improve quality care. Nursing students can benefit from this SOP both as learner and care provider.

Introduction

Airway management is a priority for nurses and first responders alike. Whether in the field or hospital, the how and when suctioning must be mastered in order to ensure the patient's patent airway. Suctioning is the mechanical aspiration of pulmonary secretions from patient with an artificial airway in place. The procedure involves patient preparation, suctioning event(s) and follow-up care. Suction is used to clear retained or excessive respiratory tract secretions in patients who are unable to do so effectively for themselves. Having an artificial airway in situ impairs the cough reflex and may increase mucus production. Secretions are removed by the application of sub-atmospheric pressure via wall mounted suction apparatus or portable suction unit.

Aim and Objective

Assessment of safety, sterility and quality of suction procedure for standardization.

Purpose

The SOP provides the framework to ensure that the management of suction is delivered safely and competently to patients of all age group with complex health needs within the provisions of a holistic health assessment and care package.

General Considerations

- In all patient care units, Endotracheal tube (ETT) fixation, suction and airway clearance competencies must be achieved prior to undertaking independent practice in each area of suctioning.
- Suction, AMBU bag and mask equipment must be available at each bed space. This equipment must be checked for working at the start of each shift .
- Suction bottles and normal saline(NS) bottles must be changed at least every 8 hours and labeled with date and time.
- An appropriate suction pressure should be set , the lowest pressure which effectively clears secretions should be used.
- The instillation of 0.9% Sodium Chloride prior to suction should not be used routinely. If a perceived need is established on occasion then the 0.9% Sodium Chloride used for instillation must be changed each time.
- To reduce the risk of vomiting, ensure feed are paused prior to suction and where possible do not perform suction immediately after a feed .
- Careful consideration must be placed on ensuring the correct placement of ETT prior to starting suction and must be secured properly.
- Suction should not be a routine procedure but needs to be assessed regularly and on an individual basis.
- It should be a 2 person procedure to ensure comfort and safety of the patients throughout the procedure

Specific Considerations

- The procedure is reviewed in three parts: prior to suctioning, during suctioning and post-suctioning.
- The recommendations prior to suctioning include patient assessment, patient preparation and hyper oxygenation.

Suctioning Technique

- The recommendations during suctioning includes appropriate catheter selection, depth of insertion, negative pressure, duration of procedure and number of suction passes. Measures for maintenance of asepsis, such as hand-washing, wearing gloves, goggles and aprons are other essential considerations, which must not be overlooked.
- The recommendations during post-suctioning includes reconnection of oxygen, patient assessment, reduction of oxygen to baseline level, and providing patient reassurance.

Indications for suctioning

- Increased respiratory rate or work of breathing
- Increased heart rate
- Apnea and/or Bradycardia
- Cyanosis and Altered level of consciousness
- Restlessness or Agitation
- Coarse breath sounds/crackles/noisy breathing/change in air entry
- Reduced chest movement and Chest x-ray changes
- Audible or visible secretions
- Deteriorating oxygen saturation levels or blood gases
- Increased peak pressures during volume ventilation
- Decreased tidal volumes when on pressure ventilation
- Changes in flow/pressure graphs on the ventilator
- Increased ETCO2 and Increased oxygen requirement
- Chest x-ray changes
- Visible secretions in the nose or mouth, which cannot be cleared by the child and Nasal flaring
- Evidence of secretions either audibly or on auscultation and/or palpation
- A child is unable to swallow effectively unaided, for example has a history of difficulties or unconscious.
- Recession

Exclusion

The exclusion of SOP is recommended in suctioning procedure during emergency condition like generalised convulsions and in neonates.

Equipments

- Functional suction unit
- One tray plastic / metallic
- Suction catheters of appropriate size for oral and ET/TR suction.
- 2 Normal saline bottles , one for oral and one for ET/TR tube.
- One NS bottle prepared as 1% sodium hypochlorite solution
- 0.9% saline for instillation if required
- PPE- disposable gown/plastic apron
- Observation monitor
- Sterile gloves, clean gloves and gauze pieces, mask and tubing
- Rubbish bag
- Hand rub
- Stethoscope

Procedure is as follows for each component:

I. **Endotracheal Suctioning (Open / Closed)**

II. **Tracheal suctioning**

III. **Oral and Nasal suctioning**

I. A. Endo-tracheal Suctioning (Open):

The following procedure for Endotracheal suction should be followed and repeated until excess saliva/mucus has been removed:

a. Pre procedure
b. Intra- procedure
c. Post procedure

I. A. a : Pre suctioning Procedure

1. Assessment

Assess the need for suction using indicators and clinical judgment.

2. Articles Required

Gather and check necessary equipment listed above.

Rationale :
For ease of performance

3. Explanation of the procedure

a. Explain the procedure to the patient and care giver (using age appropriate preparation and information) like how it will feel, why it is necessary, how long will it take.

Rationale

Explanations reduce anxiety and encourage cooperation

b. Arrange a signal by which the patient or care giver can communicate that they want the procedure stopped.

Rationale

To ensure that the patient have confident engagement for easing anxiety

4. Hand washing & PPE

- Follow infection control standards for hand hygiene

Rationale :

- To reduce the risk of introducing micro-organisms

5. Apply a pair of clean gloves and don appropriate personal protective equipment.

Rationale:

- Protection of healthcare worker

6. Nebulisation If prescribed

Rationale:

- To liquefy & remove retained thick secretions from lower respiratory tract

7. Set Suction pressure Adult :100-150 mm Hg

- Infants - 80-100 mmH

Rationale:

- Suction pressure that is too high may traumatize the mucosa & can induce hypoxia and too low will be ineffective

8. Pre Connect Suction Catheter

- Attach appropriate sized sterile suction catheter to suction tubing, using a non touch technique.

- Size calculation:

For ETT:

- Fr=[ETT(mm) X 2] -1

For TR tube:

- Fr=[TR tube(mm) x2] -1

OR

- Choose one size smaller from ETT/TR (mm) X 2

Rationale:

- Prevention of contamination and unnecessary trauma with wrong size

9. Vital Signs

- Whilst performing suction monitor respiratory rate, BP, heart rate and oxygen saturations

Rationale:

- To stop the procedure on requirement

10.Pre & Post oxygenation

- Ventilated patients: pre & post oxygenation with 100% oxygen for 2 minutes
- Patients receiving supplemental oxygen:

a. Pre oxygenate the patient with risk of turning hypoxemic due to the procedure

b. Self-ventilating on room air with risk of becoming hypoxemic during or after the procedure, pre and post oxygenate for 2 minutes

Rationale:

- Prevention of hypoxemia

11. Position the patient

- Fowler's position (15 degree)
  OR
  Choose appropriate starting position as per presence of secretions

Rationale

- Prevent aspiration of secretions.

12. Chest physiotherapy

- Appropriate Chest physiotherapy should be administered as per patient's respiratory effort and location of secretions

Rationale

- For mobilization of secretion

I.A. b : Intra Procedure

13.Sterile gloving

- Wear Sterile gloves using strict aseptic techniques and place sterile gauze pieces in sterile glove wrapper

Rationale:

- Prevention of contamination and accessibility

14. Keep dominant hand sterile

- Remove the suction catheter from its packaging.

Rationale:

- Preservation of sterilization and prevention of contamination

15. Pre lubrication

Pre lubrication of catheter with 0.9% NS

Rationale :

- Easy insertion and to check proper functioning of suction equipment

16. Measure and ensure depth of insertion

- Shallow Suctioning: The length of inserted suction catheter should only be beyond 1 cm to the tip of ETT.

- Deep Suctioning: In selected patients, deep suctioning beyond carina may be done for clearance of secretions.

Measurement:

- Centimetre making of ETT (aligned with suction catheter)+ETT Adaptor (usually 1-1.5cm).

Rationale :

- Prevention of mucosal irritation and injury

17. Gentle insertion without pressure.

18. Apply intermittent pressure on withdrawal.

19. Slow withdrawal in circular motion

Rationale:

- Allows secretion on all sides of tube to be suctioned
- Adult=Upto15 seconds
- Children>1year= Up to 10 seconds.

20. Wipe off the secretions with dry sterile gauze and rinse the secretions from the suction catheter by Suctioning the NS through it.

Rationale

- Prevention of secretion's re-insertion in ETT/TR tube and contamination of the NS bottle used.

21. Repeat the steps above if more secretions need to be Cleaned out

22. If you need to repeat the suctioning more than 2 or 3 times, rest for few deep breaths before doing each cycle.

23. Hyperventilation Choose appropriate hyperventilation (either by ventilator or AMBU bag) for 2 minutes before suctioning, in between suctioning episodes and for 2 minutes after suctioning.

24. Disconnect catheter and keep in paper wrap.

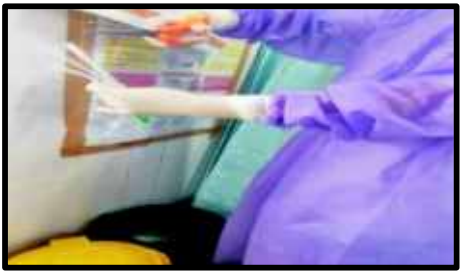
Rationale:

- Decontamination of tray and surroundings.

25. Disinfect the suction tube with NS-3 polar solution (1% sodium Hypochlorite solution)

I.A.c : Post Procedure Care

26. Discard the waste as per the hospital infection control policy



27. Replace articles

- Suction tube
- Suction device at off position
- Reposition the patient

28. Perform hand hygiene

- Decontaminate hands as per infection control guidelines

Documentation

29. Documentation of followings -

- **Amount-** + / ++ / +++
- **Colour-** Serous / Mucoid / Mucopurulent / purulent / blood or blood stained.
- **Consistency-** thick / thin

I.B: Endotracheal Suctioning – closed / in-line

(manufacturer's instructions must be referred at all times)

Closed suction is the preferred method due to the advantage of maintenance of positive pressure and PEEP during the procedure, an improved oxygenation, decreased clinical signs of hypoxemia, less instability during the procedure and prevents the spread of infection by limiting environmental personnel and patient contamination and smaller loss of lung volume. It is currently being used to minimize hazards and complications associated with endo-tracheal suctioning. During the research this technique was not performed but the citation demands further study on this procedure.

Procedure

1. Adjust ventilator settings to pre-suctioning baseline (if settings have been changed) when indicated by stabilization of patient's oxygen saturation and heart rate.

2. Explain to patients and relatives(refer open suctioning)

3. Determine suction catheter size: To obtain the correct French size multiply the ET diameter by 2, then use the next smallest size of catheter. So; if you are using an 8 mm ET tube, multiply by 2. and you get 16. Then use the next smaller catheter size. In this case, 14 French. Using a catheter size that is too large may effect the ventilator function and cause Auto-PEEP

4. Perform hand hygiene and don recommended PPE.

5. Remove cap from end of suction system and connect to wall suction tubing.

6. Unlock device by lifting suction control valve and rotating it 180 degrees.

7. If using a saline lavage, instill 0.9% sodium chloride with a 1mL syringe via the lavage port. Follow with instillation of 0.3mL-0.5mL air to flush the 0.9% sodium chloride down the tube.

8. Introduce the catheter to required depth, the appropriate colour is seen in the window at the lavage port (this will only work if the ETT hasn't been trimmed). The numbers on the suction catheter should line up with the appropriate number on the ETT.

9. Apply suction by depressing suction control valve and withdraw catheter to fully extended length. Repeat as necessary.

10. On completion, to clear secretions from the catheter, depress suction control valve before slowly instilling sodium chloride via lavage port. Follow with air to completely clear the system of sodium chloride . Remove syringe and close lavage port.

11. Ensure patient is left in a contained and comfortable position.

12. Document effectiveness of and tolerance to suctioning within the flow sheets in medical records.

13. Change closed suction system daily and place provided sticker determining next change

14. Please note, that if you are going to trim an ETT, do this prior to attaching closed suction system. If you need to trim ETT once closed suction system in place, please remove from ETT, replace original adaptor and attach neopuff, trim ETT and then insert closed suction system

II. Tracheostomy tube Suctioning

- Refer to open ETT suctioning criteria but measurement should be based on the length of the tracheostomy tube.
- A bedside guide should indicate pre-measured suction length after each tracheostomy tube change.
- Further training is required prior to caring for child >1year with a tracheostomy due to specialist considerations, especially in the first 24 hours after its formation.

III. Oral and nasal suctioning

Perform oral and nasal suction as a clean procedure

Indications

- Assess indications outlined in ETT suctioning

Contra Indications

- Unexplained haemoptysis
- Laryngospasm
- Bronchospasm
- Occluded nasal passages
- Unexplained nasal bleeding
- Severe hypoxemia/hypoxia

Procedure

1. Assess the need for suction using the indicators outlined
2. Gather and check necessary equipment - suction unit, suction catheters of appropriate type and size(12Fr and 14 Fr), clean gloves, rubbish bag, bottle of sterile NS for irrigation of suction catheter, Polar solution(1% sodium hypochlorite solution)
3. Follow infection control standards for hand hygiene and use clean gloves
4. Suction prior to feed for avoiding the risk of vomiting and aspiration.
5. Check suction pressure 80-150mmHg) and attach an appropriate size suction catheter to the suction tubing.
6. Remove the packaging from the catheter ensuring that the catheter does not come into contact with any surfaces prior to performing suction

7. During nasal suction pass the catheter gently back and not upwards into the nostril. Only apply suction pressure whilst withdrawing the catheter from the nostril, taking no more than 10-15 seconds. If resistance is felt then remove the catheter and do not attempt to pass it any further, thus reducing the risk of trauma.

8. Perform oral suction under direct vision taking care not to cause any trauma. Apply suction when withdrawing the catheter

9. Whilst performing suction monitor respiratory rate, colour, heart rate and oxygen saturations and stop the procedure if necessary

10. Use a new catheter if a repeated procedure is required, dispose of all waste and as per infection control policy

11. Perform hands hygiene as per infection control guidelines

12. Document the type, amount, colour in the nursing notes

Knowledge, skills and training

1. All staff who work in ward, ICU and HDU should be made aware of oral and nasal, ETT and TR suction procedures during their orientation to these areas and should receive more specific training as necessary and its risks and benefits.

2. All staff should be supported by the nurse in charge on a shift.

3. Chest physiotherapy is an enhanced skill that can be taught by the physiotherapist .

Monitoring Compliance and Review

•The review and revision of SOP for maintenance of accuracy and effectiveness.

TO IMPROVE THE COMPLIANCE TO SUCTION TECHNIQUE OF ARTIFICIAL AIRWAY DEVICES AMONG NURSING OFFICERS IN NS-4 WARD FROM 45% TO 80% WITHIN 8 WEEKS

Ms. Pushpa, Ms. Preety, Mr. Jamsher Khan, Ms. Prathoosh, Ms. Aneesha V, Ms. Narekala, Ms. Sudha Sharma, Ms. Rinku
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INTRODUCTION

- Artificial airway devices like Endotracheal and tracheal tubes) are required when patients in respiratory distress or airway integrity can not be achieved
- Body produces more mucus and decreases ability to clear secretions, so there is a need to remove secretions manually with suction technique to maintain airway clearance
- Artificial airway devices and suctioning technique are associated with complications (injury, bleeding and infections). So there is need to maintain uniform high standard and quality care

PROBLEM IDENTIFIED

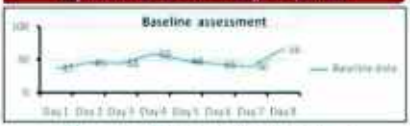
- Non compliance to artificial airway suction technique among the nursing officers in NS-4 ward (Prioritization matrix-20)

SMART AIM

- To improve the compliance to suction technique of artificial airway devices among nursing officers in NS-4 ward from 45% to 80% within 8 weeks

METHODOLOGY

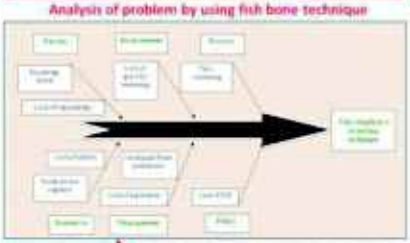
Improvement was carried out using PDCQI models



Observational checklist of suction technique

PROBLEM ANALYSIS

Analysis of problem by using fish bone technique



TESTING CHANGE IDEAS

1st change idea- Assembling all required articles to the bed side

PLAN:-
- To repair faulty suction regulators
- To provide plastic tray for every patients in sick cubicle
- Adequate provision of plastic apron, sterile gauze pieces and suction catheters

DO:- All needed articles provided

STUDY:-Suction technique observed with help of checklist

ACT:-
- Median compliance to suction technique was improved from 45% to 61%
- 1st change idea ADOPTED and plan for 2nd change

2nd change idea- Developing a Standard Operational Protocol (SOP) and training of nursing officers

PLAN:-
- To demonstration of SOP to all nursing officers
- To take return demonstration from nursing officers

DO:-
- Demonstration of SOP was given to all nursing officers
- Return demonstration was taken from nursing officers

STUDY:-
- Observation of suction technique done with help of checklist

ACT:-
- Median compliance to suction technique was improved from 61% to 86%
- 2nd change idea ADOPTED and plan for maintaining sustenance

RESULTS

Sustenance (01/09/2019- 12/10/2019)

- 3 Observation done weekly for 8 weeks
- Weekly evaluation of data to monitoring the sustenance
- SOP and checklist provided in each cubicle in NS4 ward
- Observation of suction technique was done with help of checklist
- Median compliance of operational suction technique is 82%.

CONCLUSION

- It was possible to improve compliance of suction technique and therefore reducing the suction related complication by adhering to evidence based guideline and close supervision.
- The baseline mean compliance to suction technique was 45%, that was improved up to 86% and sustained up to 82 % (Aim 80 %)

Acknowledgement

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Declaration

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