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Кафедра сестринского дела

Дисциплина «Общий уход за пациентами»
Специальность «Лечебное дело»
Очная форма обучения

Nursing Faculty, The Pavlov's State's Medical University

Nursing.

**Conceptual Framework. Clinical
Procedures.**

St.Petersburg, 2012

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Утверждено на заседании кафедры сестринского дела. Протокол № 4 от 13.12.11г.

Данное учебное пособие разработано в помощь англоязычным студентам, обучающимся по специальности «Лечебное дело», с целью развития интеллектуальных и практических навыков, требуемых для выполнения сестринских манипуляций и организации и проведения эффективного общего ухода за пациентами. Основу составляет убеждение, что деятельность современной медицинской сестры не ограничивается выполнением назначений врача: современная медицинская сестра определяет потребности пациента в сестринском уходе, планирует уход, выполняет его и оценивает его эффективность. Пособие составлено с учетом особенностей сестринского дела в европейских странах.

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Approved by the nursing faculty. Protocol # 4 of 13.12.11.

This text-book is English-speaking medical students-oriented. It aims at developing intellectual and practical skills required for an effective evidence-based nursing care to provide. It is based upon the premise that the professional nurse is the practitioner who determines the nursing needs, plans the care, provides or directs its implementation, and evaluates the efficacy of the care.

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Chapter 1. THE NURSING PROCESS

After learning this chapter, you will be able to:

1. Define the nursing process
2. Describe the five steps of the nursing process.
3. Identify the advantages of the nursing process as a model for nursing.
4. Compare medical diagnoses with nursing diagnoses
5. Describe the elements of the nursing plan
6. Develop a nursing plan.
7. Demonstrate ability to prioritize nursing diagnoses using a ranking system when developing a nursing plan
8. Discuss the trends in nursing.

The current trends

"There are global shortages of nurses and all countries are competing for them."

A study in The Journal of The American Medical Association says the U.S. will experience a 20% shortage in the number of registered nurses by the year 2020. This translates into a need for 400,000 RN's nationwide.

Anne Burke, a nurse in the emergency department of University College Hospital, Galway, said at 4am one night recently, "we were left with one nurse to look after 40 overnight patients", but when she approached her manager she was told this was the norm. "We should never accept this most abnormal of situations as the norm," she insisted. "We need enough nurses to give proper care to patients, that is, wash them, feed them and keep them alive. And we basically don't have that now,"

The NHS is becoming "over doctored" at the expense of nursing.

Today's' nurses, more than at any other time, are faced with an increasing obligation to evaluate and improve their practice.

Evaluation,... leads to a review of the planned care. The nursing process,... can be seen as a tool: a tool that enables us to give the kind of care which is characteristic of the best of professional nursing, and which enables us to unlock the door to the patient's problems, to discuss and to attend to his needs.

A conceptual framework for nursing

In the mid-19th century Florence Nightingale deplored the fact that nursing was then considered to be "little more than the administration of medicines and the application of poultices". It is curious that even today many people consider nursing to be simply a series of tasks carried out by the nurse. Undoubtedly, observable tasks are a very important aspect of nursing but this restrictive interpretation does not take account of the thinking processes which are involved before, during and after any observable task.

Throughout the world, various authors have attempted to find a definition of nursing which puts emphasis on why activities are performed rather than limiting attention to what is done – the observable tasks – and the following definition by Virginia Henderson is one of the most frequently quoted:

"Nursing is primarily assisting the individual (sick or well) in the performance of those activities contributing to health, or its recovery (or to a peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge. It is likewise the unique contribution of nursing to help the individual to be independent of such assistance as soon as possible. (Henderson, 1960).

Nursing process is central to nursing actions in any setting. It is an efficient method of organizing thought processes for clinical decision-making and problem-solving, when planning and delivering patient care.

In its early developmental years, nursing did not seek or have the means to control its own practice. Florence Nightingale, in discussing the nature of nursing, observed that "nursing has been limited to signify little more than the administration of medicines and the application of poultices" (Nightingale, 1859). While this societal attitude has persisted into the present, the nursing profession has been working to define what it is that uniquely characterizes what nurses do that other healthcare providers do not do, and to identify nursing's body of professional knowledge.

The nursing profession has identified a problem-solving process that "combines the most desirable elements of the art of nursing with the most relevant elements of systems theory using the scientific method".

This Nursing Process was introduced in the 1950s as a three-step process of assessment, planning, and evaluation based on the scientific method of observing, measuring, gathering data, and analyzing the findings. Years of study, use, and refinement have led nurses to expand the nursing process to five concrete steps which provide an efficient method of organizing thought processes for clinical decision-making, problem-solving, and the delivery of higher-quality, individualized patient care.

According to the steps of the nursing process, when a patient enters the healthcare system, the nurse collects data, identifies problems /needs (nursing diagnoses), establishes goals, identifies outcomes, and chooses nursing interventions to achieve these outcomes and goals. Finally, after these interventions have been carried out, the nurse evaluates the effectiveness of the plan of care in reaching the desired outcomes and goals to determine whether or not the problems have been resolved and the patient is ready to leave the system. If the identified problems remain

unresolved, further assessment, additional problem identification, alteration of outcomes and goals, and /or changes of interventions is required.

Practice Activity 1

1. My own definition of nursing is _____
2. The definition of Nursing Process is: _____

3. List and describe the five steps of the Nursing Process:

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

4. Chose three advantages of using the Nursing Process that you think are the most important:

- a. _____
- b. _____
- c. _____

5. Identify the steps of the Nursing Process by numbering the appropriate activity in the following vignette:

1 = Assessment; 2= Problem identification; 3= Planning; 4 = Implementation; 5 = Evaluation

Vignette: Robert, a 72-year-old male, is admitted with pneumonia. _____

He reports that this is his second episode in 6 months. _____

Temperature is 101 F, skin hot and flushed. _____

He complains of frequent, hacking cough with moderate amount of thick greenish mucus. _____

His mucous membranes are pale, and his lips are dry and cracked. _____

You determine that Robert has an ineffective airway clearance, a fluid volume deficit, and a knowledge deficit that will require teaching to promote adequate self-care and to prevent recurrence. _____

You establish the following outcomes:

Expectorates secretions completely with breath sounds clear and respiration noiseless. _____

Demonstrates adequate fluid balance with moist mucous membranes and loose respiratory secretions. _____

Verbalizes understanding of cause of condition and therapeutic regimen. _____

You decide to set up a regular schedule for respiratory activities and fluid replacement. _____

In addition, you formulate a teaching plan to cover the identified concerns for self-care and illness prevention. _____

You provide a tube of petroleum jelly for Robert to use on his lips. _____

Every 2 hours you visit Robert to encourage him to deep-breathe, cough, change his position, and drink a glass of fluid of his choice. _____

The following day, Robert's skin is no longer hot and flushed, temperature is 99 F, secretions are loose and readily expectorates, and breath sounds are clearing. _____

Robert's lips and oral membranes are moist. _____

He is able to explain in his own words how to care for himself and how to prevent pneumonia. _____

You decide that the current treatment plan is achieving the identified outcomes and to continue the plan as written. ____

The Diagnosis Phase: Problem Identification

The second phase of the nursing process is often referred to as "ANALYSIS", as well as "PROBLEM IDENTIFICATION" or "NURSING DIAGNOSIS". Although all of these terms may be used interchangeably, the purpose of this step is to draw conclusions regarding a patient's specific problems or needs so that effective care can be planned and delivered.

Nursing diagnosis is a clinical judgment about individual, family, or community responses to actual and potential health problems / life processes. Nursing diagnoses provide the basis for selection of nursing interventions to achieve outcomes for which the nurse is accountable.

Although nurses work within the nursing, medical, and psychosocial domains, nursing's phenomena of concern are patterns of human response, not disease processes. Therefore, nursing diagnoses do not parallel medical /psychiatric diagnoses but do involve independent nursing activities as well as collaborative roles and actions.

The nursing diagnosis is as correct as the present data will allow because it is supported by the immediate data collected. It says what the patient's situation is at the present time and reflects changes in the patient's condition as they occur. Each decision the nurse makes is time-dependent and, with additional information gathered at a later point in time, these decisions may change. Unlike medical diagnoses, nursing diagnoses change as the patient progresses through various stages of illness /maladaptation, to resolution of the problem or to the conclusion of the condition. For example, for a patient undergoing cardiac surgery, initial problems /needs may be Pain, Cardiac Output, Airway Clearance, and High Risk for Infection. As the patient progresses, problems /needs may shift to Activity Intolerance, Knowledge Deficit and Role Performance.

The Planning Phase: Creating the Plan of Care

Attention is focused on the most appropriate actions which will effectively address the patient's problems. The nurse begins to set priorities: establish goals; identify desired outcomes; and determine specific nursing interventions. These actions documented as the PLAN of CARE, which then serves to guide the activities of all healthcare workers who are involved in the patient's care.

Setting Priorities for patient care: Abraham Maslow's theory of human needs

The starting point for the planning of care is the establishment of a general ranking of the patient's problems /needs, so that the nurse' attention and subsequent actions are properly focused. While there are many ways of prioritizing patient needs, one framework which has been found useful is a hierarchy developed by Abraham Maslow.

In 1943, Maslow theorized that human behavior is motivated by a hierarchy arranged from the most basic to progressively higher-level needs. Physiologic needs are generally considered as base-line survival needs because they must be met in order for life to continue. When these base-level needs (such as food, fluid, and oxygen) are not satisfied, it is difficult or impossible to meet higher-level needs. This knowledge of the needs that must be met first can help the nurse determine the priorities of patient care.

For example, basic survival needs (i.e., air, water, and food) must be met before other needs can be considered. Sample diagnostic labels involving basic survival needs include Airway Clearance, Ineffective and Nutrition, altered, less than body requirements. Safety needs are next in order of importance. Nursing diagnostic labels relating to safety needs include Violence, high risk for, directed at self /others; Injury, high risk for; Health Maintenance, altered. Once these categories of needs are met, concerns regarding needs in the social, self-esteem, and self-actualization categories can be considered. Examples of nursing diagnoses labels relating to these categories of needs are: Social Interaction, impaired (a need for relationships with others); Self-Esteem, disturbance (the need to feel good about oneself); and Family Coping, potential for growth (a need for family and belonging).

Practice Activity 2: Prioritizing Nursing Diagnoses

Instructions: prioritize nursing diagnoses using a ranking system.

- a. _____ incontinence, stress
 _____ sexuality patterns, altered
 _____ airway clearance, ineffective
 _____ skin integrity, impaired, high risk
- b. _____ gas exchange, impaired
 _____ knowledge deficit
 _____ hypothermia
 _____ infection, high risk for
- c. _____ pain, acute
 _____ self-esteem, chronic low
 _____ physical mobility, impaired
 _____ social isolation

Short-term and Long-term Goals

Goals involve varying timeframes and may be either long-term or short-term.

LONG-TERM GOALS indicate the overall direction /end result of care and may very well not be achieved prior to discharge.

Examples:

"Maintains control of blood sugar level";

"Uses resources /supports to prevent rehospitalization".

SHORT-TERM GOALS are more specific guides for care and must usually be met prior to discharge or transfer to a less acute level of care, supervision, or support.

Example:

"Reduces myocardial workload"

"Maintains impulse control".

If the short-goal is to be met within the nursing shift during which it is identified, the goal need not be written on the plan of care but would be noted in the progress note. If the goal is not accomplished by the end of the shift, it would then be added to the plan of care, with a new timeframe, so that oncoming nurses can continue to work toward the goal.

Identifying Desired Outcomes

The next step in developing the plan of care is the formation of specific measurable OUTCOMES, which are defined as patient responses that are achievable, that are desired by the patient, and that can be attained within a defined time period given the present situation and resources. Because they must be measurable, outcome statements need to:

- be specific,
- be realistic,
- consider the patient's circumstances and desires
- indicate a definite timeframe for achievement
- provide measurable evaluation criteria for determination of success or failure in achieving the desired effect.

Desired outcomes are written by listing items /behavior which can be observed and monitored to determine whether or not a positive /acceptable outcome has been achieved within the indicated timeframe.

Example:

"Verbalizes understanding of disease process and potential complications..."

"Patient will: ambulate with use of cane"

"Patient will: ambulate with cane without assistance within 3 days".

Action verbs useful in writing measurable outcomes

The following are example of action verbs that can be measured or observed. Using action rather than “passive” verbs provide a means by which patient progress can be determined.

List, Records, Name, State

Describe, Explain, Identify

Demonstrate, Use, Schedule

Differentiate, Compare, Relate

Design, Prepare, Formulate

Select, Choose, Compare

Increase/Decrease, Stand, Walk, Participate

Example: “The patient will: List three things he understands about his diagnosis”. “The patient will: Walk to the end of the hall and back three times today”.

Below are a few samples of “passive” verbs. Notice that the “actions” described by the verbs are not measurable:

Understand, Feel, Learn, Know, Accept.

Example: The patient will: Understand his treatment plan. How will the nurse measure achievement and know that the patient understands?

Practice Activity 3: Identifying Correctly Stated Outcomes

Instructions: Identify which of the following statements are correct, and modify those that are not.

1. Patient will: List individual risk factors and appropriate interventions. _____
2. Patient will: identify adaptive/protective measures for individual situation by discharge. _____
3. Patient will: Understand behaviors lifestyle changes necessary to promote physical safety within 72 hours. _____

4. Airway is patent, aspiration is prevented, ongoing. _____

5. Patient will: Assume responsibility for own learning by using available resources and participating in group discussions within 3 days. _____

Selecting appropriate Nursing interventions

Nursing interventions are prescriptions for specific behaviors expected from the patient, and actions to be carried out by nurses. The expectation is that the prescribed behavior /actions will benefit the patient and /or significant other(s) in a predictable way, related to the identified problem /need and chosen outcomes. These interventions have the intent of individualizing care and are geared toward meeting a specific patient need. They should be age /situation appropriate and promote identified patient strengths, when possible.

Example:

Discussion of fears may help to reduce the adult patient’s level of anxiety, while an infant will respond more positively to holding and cuddling.

Orange juice is a good choice for fluid replacement unless the patient has open lesions on the oral mucosa.

Nursing interventions should be specific and clearly state:

- the date the intervention is written
- an action verb reflecting the activity to be performed
- qualifiers of how, when, where, time /frequency, and amount
- signature _____ and _____ /or _____ initials _____ of _____ originating _____ nurse.

Practice Activity 4: Identifying Correctly Stated Interventions

Instructions: Identify which of the following interventions are correctly stated, and rewrite those that are not.

1. Walk length of hall 2x/day with assistance of two staff members. _____

2. Force fluids. _____

3. Encourage deep breathing exercise and cough q 12 h. _____

4. Reduce environmental stimuli. _____

5. Provide written handout for side-effects of medications prior to discharge. _____

Chapter 2. OBSERVATIONS

After learning this chapter, you will be able to:

1. Identify the nursing interventions related to the observation
2. Define the terms “blood pressure”, “pulse”, “temperature”
3. Identify indications for taking blood pressure, pulse and temperature measuring
4. Compare the blood pressure types
5. Describe a method of recording and equipments
6. Identify the site for a pulse to measure
7. Describe the pulse characteristics
8. Identify the sites for measuring a temperature

9. Demonstrate blood pressure taking skills
10. Identify the pulse- and temperature-taking- related categories
11. Rationale taking blood pressure, measuring pulse and temperature for the different patient categories (by using a nursing plan of care).

Blood Pressure

Definition

Blood pressure may be defined as the force which the blood exerts on the walls of the vessels in which it is contained. This may be represented as an equation: **Blood pressure = cardiac output x peripheral resistance.**

Indications

Blood pressure is measured for one of two reasons:

1. to establish a baseline in blood pressure
2. to monitor fluctuations in blood pressure.

Normal blood pressure

Normal blood pressure is generally held to range from 100/60 to 140/90 mm Hg.

Systolic pressure

The systolic pressure is the maximum pressure of the blood against the wall of the vessel following ventricular contraction and is taken as an indication of the integrity of the heart, arteries and arterioles.

Diastolic pressure

The diastolic pressure is the minimum pressure of the blood against the wall of the vessel following closure of the aortic valve and is taken as a direct indication of blood vessel resistance.

Pulse pressure

The pulse pressure is the difference between systolic and diastolic readings.

Basal blood pressure

The basal blood pressure is the lowest blood pressure taken in a supine position after several days in hospital without treatment.

Factors affecting blood pressure

1. Circulating blood volume.
2. Elastic recoil of the arteries
3. Blood viscosity.
4. Cardiac output
5. Neurogenic factors.

Methods of recording and equipment

CATEGORY	FREQUENCY	RATIONALE
All new admissions	Once only, preferably when the patient has settled in.	To provide a baseline.
Hypertensive patient.	Four-hourly until condition is stable.	To monitor the condition of the patient so that any necessary action can be taken.
Postoperative patient.	Half-hourly, depending on the patient's condition, then 4-hourly until condition is stable.	To detect postoperative hypo- or hypertension.
Critically ill patient, e.g. unconscious patient.	As often as determined by condition.	To monitor blood pressure closely.
Pregnant client.	Daily.	To detect hypo- or hypertension.
Patient receiving a blood transfusion.	When unit is put up. Observe the patient at 5-minute intervals for the first 15-20 minutes and take again 1 hour later if condition warrants it. If blood pressure fluctuates or the patient shows other signs of reaction, record again and as demanded by condition.	To record a baseline blood pressure and monitor any reaction to the transfusion.
Patients receiving intravenous infusion.	Four-hourly.	To monitor circulatory overload.
Patient with local or systematic infection.	Four-hourly until condition is stable.	To detect any signs or symptoms of shock.
Patient receiving any drug known to cause fluctuations in blood pressure.	Twice daily.	To monitor reaction to the drug
Patient with prolonged or profound	Four-hourly until neutrophil count	To detect septicaemic shock that

neutropenia.*	rises.	may not manifest itself in pyrexia or signs of local infection
Patient not feeling well or nurse concerned about patient.	Once, if outside the normal ranges, check again 2-3 hours later and take appropriate action.	To reassure the patient and nurse and to ensure that appropriate action is taken if blood pressure is remarkable.

There are two main categories of method for recording the blood pressure : direct and indirect.

The indirect method is the one most suitable for the nurses' purpose. All indirect methods are based upon the occluding devised by Riva-Rocci at the end of the 19th century and Korotkoff at the beginning of the 20th century.

The Stethoscope

Using the stethoscope, it is possible to identify a series of five phases as blood pressure falls from the systolic to the diastolic. These phases are known as Korotkoff's sounds:

1. the appearance of faint, clear tapping sounds which gradually increase in intensity;
2. the softening of sounds which may become swishing
3. the return of sharper sounds which become crisper but never fully regain the intensity of the phase 1 sounds;
4. the distinct muffling sounds which become soft and blowing;
5. the point at which all sounds cease.

*Neutropenia is an abnormally low level of neutrophils in the blood. Neutrophils are white blood cells (wbcs) produced in the bone marrow that ingest bacteria.

Pulse

Definition

The pulse is a rhythmic throbbing caused by regular expansion and contraction of an artery as blood is forced into it by the contraction of the left ventricle of the heart.

Indications

The pulse is taken for the following reasons:

1. to establish a baseline pulse;
2. to monitor fluctuations in pulse.

Sites for measuring

The pulse is measured at the following sites:

1. temporal
2. carotid
3. brachial
4. radial
5. ulnar
6. femoral
7. Popliteal
8. tibial
9. Pedal.

The heart beats about 70 times every minutes normally in the adult, sending 5 litres of blood through the body. This cardiac content equals the volume of blood in each systole (the stroke volume) times the rate per minute. This may be represented as an equation: **Cardiac output = Stroke volume x Rate.**

When the stroke volume decreases, as in shock, the rate increases, maintaining a constant cardiac output.

The pulse is palpated to note the following:

1. rate
2. Rhythm
3. Force of amplitude
4. quality
5. elasticity.

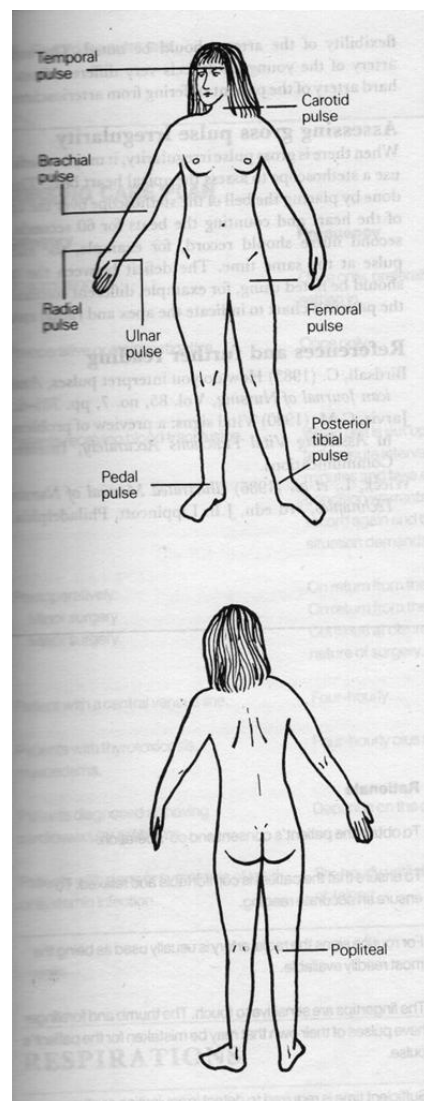
Rate

The rate is what is palpated at some peripheral artery as the pulse count. The resting adult will normally have a pulse of between 60 and 100 beats per minute. It is slightly faster in women than men and even more rapid in infants and children. There is also a mild increase in old age.

Tachycardia (rapid pulse rate) occurs as a consequence of:

1. pain
2. anger, fear, anxiety
3. exercise
4. fever
5. Anaemia*
6. hypoxia
7. shock
8. Congestive cardiac failure.

Pain, anger, fear and anxiety all stimulate the sympathetic nervous system. Congestive cardiac failure, anaemia, exercise and fever all require greater oxygenation and, therefore, greater cardiac output.



Bradycardia (slow pulse rate) occurs in all conditions that cause stimulation of the functional parasympathetic nervous system. It is also found in fit athletes.

*Anaemia - is a decrease in number of red blood cells (RBCs) or less than the normal quantity of hemoglobin in the blood.

Rhythm

The rhythm should be regular. There are two normal exceptions:

Sinus Arrhythmia

Sinus arrhythmia is an irregular pulse that increases at the peak of inspiration and decreases on expiration. It is common in children and young adults.

Premature beat or bigeminal pulse

This condition occurs occasionally when some other pacemaker fires ahead of the sinoatrial node. Doing so prematurely, it causes an early systole. Because of the reduced filling time, the stroke volume is decreased enough for a pause in rhythm to be felt. Frequent premature ventricular contractions may indicate cardiac irritability, hypoxia, digitalis overdose, potassium imbalance, or are signs of more serious dysrhythmias.

Force or amplitude

The pulse pressure is the difference between systolic and diastolic pressure. Amplitude is a reflection of pulse strength. A full, throbbing pulse may indicate such conditions as complete heart block, anaemia or heart failure. Anxiety, alcohol or exercise may produce the same result.

Quality

The character of the pulse may be noted on a scale such as the following:

- 3+ bounding pulse
- 2+ normal pulse
- 1+ weak, thread pulse
- 0 absent pulse.

Paradoxical pulse is a pulse that markedly decreases in size during inspiration. On inspiration more blood is pooled in the lungs and so decreases the return to the left side of the heart; this affects the consequent stroke volume. A paradoxical pulse is usually regarded as normal, although in conjunction with such features as hypotension and dyspnoea it may indicate cardiac tamponade.

Elasticity

This refers to the elastic recoil of the arterial wall. The flexibility of the artery should be noted. The supple artery of the young adult feels very different from the hard artery of the patient suffering from arteriosclerosis.

Assessing gross pulse irregularity

When there is gross pulse irregularity, it may be useful to use a stethoscope to assess the apical heart beat. This is done by placing the bell of the stethoscope over the apex of the heart and counting the beats for 6 seconds. A second nurse should record, for example, the radial pulse at the same time. The deficit between the two should be noted using, for example, difference colors on the patient's chart to indicate the apex and radial rates.

Guidelines: Taking PULSE PROCEDURE

ACTION	RATIONALE
1. Explain the procedure to the patient.	To obtain the patient's consent and co-operation.
2. Ensure that the patient is in a comfortable, but also the required position.	To ensure that the patient is comfortable and relaxed. To ensure an accurate reading.
3. Palpate whichever peripheral is being used to record the pulse.	For routine signs the radial artery is usually used as being the most readily available.
4. Place the second or third fingers along the appropriate artery and press gently.	The fingertips are sensitive to touch. The thumb and forefinger have pulses of their own that may be mistaken for the patient's pulse.
5. The pulse should be counted for 60 seconds.	Sufficient time is required to detect irregularities or other defects. The normal ranges are: (a) about 72 beats per minute for men (b) 72-84 beats per minute for women
6. Record the pulse rate	To monitor differences and detect trends. Any irregularities should be brought to the attention of the appropriate personnel.

Nursing Care Plan Category

Frequency

Rationale

On admission	Once only, preferably when patient is settled in.	To provide an accurate baseline.
Preoperative or preinvestigative.	Once only.	To provide an accurate baseline and to check that the patient's pulse is not irregular.
Patients receiving blood transfusion.	When unit is put up. Observe the patient at 5-minute intervals for the first 15-20 minutes and take again 1 hour later if condition warrants. If pulse rate rises, record again and then as often as situation demands.	To record a baseline pulse and to detect any indication of reaction to the blood transfusion.
Postoperatively: Minor surgery Major surgery.	On return from theatre only. On return from theatre, then 4-6 hourly. Continue at discretion depending on nature of surgery.	To detect any cardiovascular changes and to monitor the patient's condition.
Patient with a central venous line.	Four-hourly.	To monitor the patient's cardiac function.
Patients diagnosed as having cardiovascular problems.	Depends on the condition	To monitor the patient's cardiac function.
Patients with signs or symptoms of local or systemic infection.	Six-hourly until six normal recordings obtained.	To monitor the development or course of the infection.

Temperature

Definition

Body temperature represents the balance between heat gain and heat loss as measured by a thermometer.

Indications

Measurement of body temperature is carried out for two reasons:

1. to establish a baseline temperature
2. to monitor fluctuations in temperature.

Temperature recording site

Oral

The pocket of tissue at the base of the tongue lies immediately above the sublingual artery. The proximity of this artery to the external carotid artery means that changes in core temperature are quickly reflected here.

Oral temperatures are affected by the temperatures of ingested foods and fluids and by the muscular activity of chewing. Smoking will also affect the thermometer reading. It is recommended that the nurses waits 15 minutes following any of these activities before inserting the thermometer to allow the temperature to return to baseline level.

It is important that the thermometer is placed in the sublingual pocket and not in the area under the front of the tongue as there may be a temperature difference of up to 1.7 C between these areas. The sublingual pockets are more protected from the air currents which cool the frontal areas and would result in a false low reading of a thermometer placed there.

Rectal

The rectal temperature is often higher than the oral temperature because this site is more sheltered from the external environment. However, this does not necessarily imply an increase in accuracy as the rectum is far from the central circulation and is inferior to the oral site in reflecting changes in temperature in the vital central organs. The presence of soft stool may separate the thermometer from the bowel wall and give a false reading, especially if the central temperature is changing rapidly. In infant this method is not recommended as it provides a risk of rectal ulceration or perforation.

A rectal thermometer should be inserted at least 4 cm in an adult to obtain the most accurate reading.

Axilla

The axilla is considered a less desirable site than the others since it is not close to major vessels and skin surface temperatures vary more with changes in temperature of the environment. It is a convenient site for patients who are unsuitable for, or who cannot tolerate, oral thermometer, e.g. after general anaesthetic.

To take an axillary temperature reading the thermometer should be placed in the centre of the armpit, with the patient's arm firmly against the side of the chest. The thermometer will take longer to register than when in the oral site.

Note: Whatever site is chosen for temperature measurement, it is important that this is then used consistently as switching between sites can produce a record that is misleading or difficult to interpret.

Time for recording temperature

The average person experience circadian rhythms which make their highest body temperature occur in the late afternoon or early evening, i.e. between 4pm and 8 pm. The most sensitive time for detecting pyrexias appears to be

between 7pm and 8pm. This should be considered when interpreting variations in 4-hourly or 6-hourly observations and when taking once-daily temperatures.

Nursing Care Plan

Category	Frequency	Rationale
On admission.	Once only, preferably when the patient has settled in.	To provide an accurate baseline.
Preoperative or pre-investigative.	Once only.	To provide an accurate baseline and to check that the patient is not pyrexial.
Pyrexial (fever) patients.	At least 6-hourly; possible hourly. Frequency is affected by direction of temperature movement, e.g. rising, falling or static.	To monitor the condition of the patient so that any necessary action can be instigated. Note: Patients receiving steroids may show only very slight rises in temperature even when suffering from severe infection.
Patients receiving blood transfusions.	When the unit is put up, observe the patient at 5-minute intervals for the first 15-20 minutes and again 1 hour later if the patient's condition warrants. If the patient's pulse rate rises or the patient shows other signs of reaction, record again, and then as often as the situation demands.	To record a baseline temperature and to monitor any reaction to the transfusion.
Postoperative (minor surgery)	On return from the theatre only.	To detect postoperative hypothermia.
Postoperative (major surgery)	On return from the theatre, then 4-to-6-hourly. Continue at your discretion, depending on the nature of the surgery.	To detect postoperative hypothermia and to monitor any pyrexia, e.g. due to infection.
Patient receiving steroids.	Four-hourly.	A very slight rise in temperature may be indicative of severe infection.
Patients receiving cytotoxic chemotherapy or antibiotics.	Daily.	To detect any development of infection or drug reaction.
Patients receiving radiotherapy.	As necessary, depending on area and dose.	To detect developing infections when defense mechanisms are lowered by the nature of the treatment.
Patients with a central venous line.	Every 4 hours.	To identify any infection introduced by the central venous catheter as soon as possible.
Patients with a white blood cell count of less than 1000 cells/mm ³	Every 4-6 hours.	To detect any developing infection as soon as possible so that appropriate therapy can be given.
Patients in close contact with a known source of infection.	Daily.	To check that infection has not been transmitted.
Patients with signs and /or symptoms of systemic or local infection.	Every 6 hours until six normal recordings are obtained.	To monitor the development of regression of infection.
Patient not feeling well or nurse concerned about patient.	Once. However, if the temperature is elevated, check again 2-3 hours later and take appropriate action.	To reassure the patient and the nurse. To check whether the patient is pyrexial and if so ensure that appropriate action is taken.
Continuing care patients.	Daily.	Mainly because patients expect their temperature to be taken. This is therefore omitted or increased at the nurses' discretion.

Chapter 3. INFECTION CONTROL

After learning this chapter, you will be able to:

1. Define iatrogenic infection
2. Define an aseptic technique
3. Identify the principles of asepsis
4. Identify contributing factors
5. Define and compare the terms "disinfection" and "sterilization"
6. Demonstrate handwashing technique
7. Apply aseptic technique when taking contaminated/used gloves off
8. Identify the main factors contributing to the development of the main hospital-acquired infections
9. Apply the aseptic technique when describing how to control hospital-acquired infections

Aseptic Technique

Aseptic technique is a method used to prevent contamination of wounds and other susceptible sites by ensuring that only sterile objects and fluids come into contact with these sites and that the risk of contamination is minimized.

Indication

Aseptic technique is intended to prevent infection of a wound or susceptible site due to:

1. The size, position or nature of that wound or site, e.g. recent surgical incisions:
2. increased susceptibility of the host to infection, e.g. neutropenia or cachexia
3. Environmental factors, e.g. high humidity or other infected patient.

Principles of asepsis

The aim of using an aseptic technique is to prevent the spread of infection by direct or indirect transmission. When dressing a wound, the most usual means of infection spread are as follows:

1. the hands of the staff involved
2. inanimate objects, e.g. instruments and clothes:
3. dust particles or droplet nuclei suspended in the atmosphere.

Hand washing

Hand washing greatly reduces the risk of infection transfer but studies have shown that this is rarely carried out in a satisfactory fashion. The purpose of handwashing is to remove dirt and reduce the load of bacteria on the skin of the hands.

A wash with ordinary soap and water removes much of the **transient** bacterial flora. This outcome is improved if an antiseptic soap (with chlorhexidine or povidone iodine) is substituted for ordinary soap. The **resident** flora of healthy hands is less likely to cause infections, through this does not apply to immunocompromised patients. Resident bacteria are reduced in number by handwashing, particularly if a detergent containing an antiseptic is used, but they cannot be eliminated. Among these residents *Staphylococcus epidermidis* is now an important pathogen for immunocompromised patients (being a member of the resident flora of 100% of the population).

Trivial injury profoundly alters the resident flora of the skin. Damage may be due to the minor traumas hands suffer every day or be caused by failure to rinse or dry the hands properly after washing, by the frequent use of strong detergents and antiseptics or by the vigorous use of a nail brush. When the hands of healthcare staff are damaged the new and more numerous bacterial residents may include important causes of iatrogenic infections, including MRSA. These have become true residents so are not removed by washing, even if an antiseptic is used. Staff in this condition is a serious threat to patients. Because the injury may be inconspicuous (a tiny hang-nail, for example), an individual may ignore or even be unaware of it. Unless such people are tested bacteriologically they cannot know they are carrying important pathogens.

Nail brushes should be used very little if at all and only to remove dirt that is ingrained or trapped under the nails and for the latter a scraper may be substituted. A nail brush plus a strong detergent is much more likely to damage the skin. Microbiologically, the traditional form of "scrubbing up" in surgery for five to ten minutes does not seem to improve on an energetic wash with an antiseptic detergent for two or three minutes.

Handwashing between cases on a surgical list may be restricted to one minute. Outside operating departments a 15-second wash probably suffices for hands that are already "clean", through somewhat longer is required for hands that are "dirty" (badly contaminated).

A point worth remembering is that the water used for washing hands is rarely anything like sterile; indeed, it may contain surprisingly large numbers of bacteria. This is one of the reasons why a rub with alcohol improved the hygiene of the hands after a surgical "scrub".

The technique of washing requires attention. As shown, many people fail to wash their thumbs properly when they wash their hands. Wet hands are socially unacceptable and careful atraumatic drying also serves to lessen the damage that accompanies frequent washing.

Alternatives to handwashing

Alcohol is a powerful antiseptic that evaporates quickly. Applied to the skin at about 70% in water, it rapidly kills transient and a proportion of the resident bacteria and then disappears. When it is desired to reduce the bacterial load on hands that are not obviously soiled, washing can be replaced by the application of alcohol. The inclusion of a non-volatile antiseptic (chlorhexidine) adds a residual effect to the immediate action of the alcohol. If an emollient like glycerine and perhaps a perfume are added the result is a degerming lotion of handrub that does not dry the skin too much.

The wearing of gloves offers a third, most effective, but more expensive way of preventing the transfer of organisms to and from the hands. There has been a recent significant increase in the use of gloves throughout the healthcare industry. This is a reaction to the perceived risk of occupational HIV infection, so the motivation is reversed. If the same gloves are worn to complete multiple separate procedures they must be washed in between in exactly the same way as the naked hands.

Gloves

As with mask, gloves are used to provide a barrier in two directions, to protect either patients or healthcare workers from pathogenic microbes carried by the other. They may also be used to reduce the unpleasant nature of certain aesthetically unattractive tasks.

To protect patients from the microbes on healthcare worker's hands. Gloves must be changed or otherwise freed of pathogens at least between patient contacts and sometimes within individual procedures as well.

To protect healthcare workers from patients' microbes (provided the gloves are not torn or punctured), they need not be changed or treated in any way at all.

To achieve full protection, though, it is important to wash the hands immediately after the gloves have been removed. This is to counter the effect of invisible punctures and because a hand may be contaminated from the outside of a glove as it is removed.

High-risk areas

A dilemma arises in ICUs and in other areas where immunocompromised patients are cared for, where the risk of IAI is high and handwashing ought to be more frequent. The use of antiseptic detergents that incorporate chlorhexidine or an iodophor is often encouraged in such places with the sensible intention of reducing the bacterial population of the hands. However, if this leads to damage to the skin then the hands may be more dangerous than if ordinary soap had been used or even if they had not been washed at all.

A way-out of the dilemma might be to provide several different handcare regimes in high-risk areas, to be used alternatively or sequentially at the discretion of the staff members or according to some protocol. The object would be to reduce the possibility of damage to the hands that can follow the repeated use of a single method on its own. Such techniques as washing with ordinary soap with antiseptic detergents, the use of a degerming lotion, the wearing of gloves and the washing or antiseptic degerming of gloved hands between procedures might be used sequentially or as the task to be performed dictates.

In other clinical areas handwashing with ordinary soap is generally thought to be sufficient, though degerming lotions are useful as a quick alternative during procedures or in the course of duties that demand more than one hand wash to complete them. Degerming lotions have a particular application where facilities for washing hand are inadequate.

Disinfection and sterilization

It is customary to divide the agencies or agents used to kill or disable microbes into those that "sterilize" and those that "disinfect". **Sterilization** is often defined as a process designed to destroy all living things, so microbiological sterility is the total absence of microbes able to reproduce themselves. A sterilized product is therefore no longer infectious; though it may still be microbiologically toxic due to the presence of dead microbes, parts of them or their products ("pyrogens").

This definition breaks down because, in practice, absolute and total destruction, ultimately, is unattainable (Kelsey, 1972). It is perfectly possible to design tests so severe that none of the current sterilizing methods would pass them. To overcome this largely theoretical difficulty it has generally been accepted that sterilization is achieved by a process that reliably and reproducibly kills something approaching one million resistant bacterial spores.

A process that kills or inactivates useful numbers of microbes but cannot reliably produce complete sterilization is called **disinfection**. Diagnostic or therapeutic instruments intended for invasive use ideally should be sterile. Because some of them are made of material that would be damaged or destroyed by the more vigorous process of sterilization, they are disinfected instead. To be effective a disinfecting agent must reduce the number of microbes present on or in an object to a level judged to be harmless in the context concerned and for the purpose intended. Chemical disinfecting agents are called **disinfectants**. If a disinfectant is sufficiently non-toxic to be used on skin, mucous membranes or exposed tissue, it may be called an **antiseptic**.

In all disinfection and sterilization practice it is important to ensure that objects to be treated are as clean as possible before they are exposed to the process.

Characteristics and control of specific iatrogenic infections

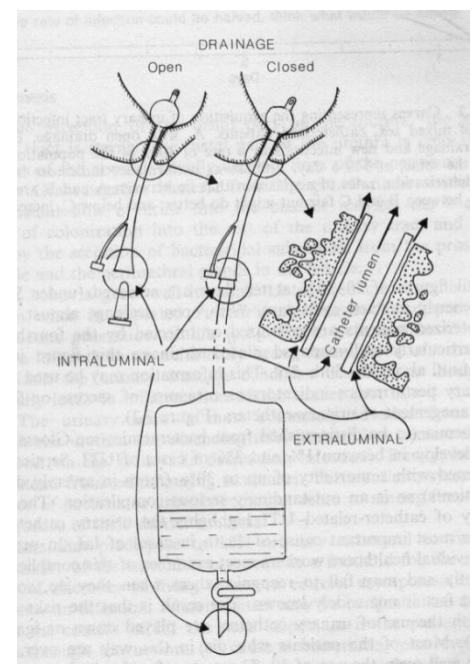
Urinary Tract Infections

Most surveys of iatrogenic infections have shown that the anatomical site most often involved is the urinary tract. (Urinary tract infections (UTIs) accounted for 23%-45% as recorded). Most iatrogenic UTIs appear to be endemic, as befits what has been perceived as an endogenous infection. Detailed typing of the microbes responsible however, suggests that in a significant number of cases their causes may be the autogenous variety of self-infection, so they lie in the grey area between self- and cross-infections. There are strong associations between these infections and urethral instrumentation, particularly catheterization. Urethral catheters are thought to be the cause of about 80% of the UTIs acquired in hospitals and other forms of urethral instrumentation probably account for another 10%.

With closed drainage and average-to-good conditions of care, just under 10% of uninfected patients are newly infected each day catheterization persists, to reach a total of 50-60% by the tenth day. With open drainage almost 100% of catheterized patients are colonized or infected by the fourth day. With particularly well-managed closed drainage this figure is not reached until about the 30th day.

Control

Catheter-related UTI may be caused by self-infection or by cross-infection and the bacteria that gain entry do so by **extra-** or **intra-luminal route**. Strategies for preventing the entry of bacteria into the urinary tract differ according to which route is followed. Closed drainage reduces the chance of intraluminal



spread, but it cannot influence the extraluminal route. If patients' urines are colonized too early after catheterization, the most likely cause is intraluminal spread due to poor quality care and a failure to keep the drainage system closed.

It may be necessary to break the connection between a catheter and its collection system to irrigate the bladder to remove blood clots. The need to do this can be reduced if a three-way catheter is used, but multi-lumen catheters facilitates the inadvertent conversion of a closed system into an open one. As a cardinal rule closed systems should not be opened for trivial reasons. Urine samples should be collected from the closed system with a syringe and needle and not be breaking the connection between catheter and bag.

The only regular reason for opening the system is to drain the urine that has collected in the catheter bag. The intraluminal spread of bacteria into the bladder is often preceded by a colonization of this urine and this results from carelessness when emptying the bag.

Emptying should be a careful, clean procedure.

Hands should be washed before and after and a plastic apron worn if splashing is likely.

The jug or vessel should be thoroughly washed and dried between each use.

Gloves are necessary if the bag is constructed so that hands are likely to be contaminated with urine.

A nurse who moves from bag to bag without disinfection of the jug and appropriate handcare is negligent. In hospital carelessness in the handling of catheters and drainage bags is generally more common at night.

The addition of a disinfection to collecting bags might prevent bacterial colonization of the urine in it and some systems have incorporated non-return valves to prevent the reflux of possibly contaminated urine from the bag into the bladder. Neither strategy has been effective in all trials and in any case these measures are only necessary if simple primary rules are broken. The bag should not be raised above the level of the urethra nor allowed to trail on the floor. If there is a risk of reflux (when a patient is being moved, for example), the tubing should be clamped temporarily (and, of course, unclamped afterwards). Catheterization is usually ended after a few days, so in most cases the bag does not need to be changed. In long term catheterization catheters should be changed as determined by patient assessment and the collection system should be renewed at the same time.

In extraluminal spread the initial entry of bacteria into the bladder is limited if meticulous attention is paid to aseptic non-traumatic procedure at catheter insertion. The lubrication of the urethra with an anesthetic jelly containing an antiseptic has been shown to reduce the rate of infection. Catheters of smaller diameters are less traumatic and offer a reduced surface area for the development of biofilm. Smaller self-retaining balloons minimize the volume of the permanent pool of residual urine retained at the bladder neck. Catheters made of silicone rubber appear to delay the development of abnormal bacterial colonization in the space between the catheter and the wall of the urethra and catheters coated with or made of materials possessing special physical or disinfectant properties may also limit the development of biofilm.

The incidence of hospital-acquired UTI can be reduced by avoiding catheterization whenever possible and by removing any catheters that are inserted at the earliest possible moment. Those who catheterize for convenience need to be reminded that the insertion of a catheter carries a mortality. A catheter should not be used only to collect a specimen of urine. Incontinence pads can replace some catheterization with benefit to infection rates, but their use is associated with disposal problems. The use of condom-like collection systems for males can reduce infections, but only if damage to and infection of the skin of the penis is avoided. Intermittent catheterization has been used to replace both short- and long-term catheterization. In good hands the technique has prevented infections, but care is necessary to avoid trauma to the urethra.

Respiratory tract infections

Among iatrogenic infection the most difficult to diagnosed and to control are often those of the lower respiratory tract. As noted, urinary tract infections are inevitable in catheterized patients. The microbes concerned gain access by intra- or extraluminal routes. The same applies in the case of respiratory intubation. The intraluminal route via the inhaled air can not be controlled unless patients breathe sterile air, a thing not easily achieved and in any case of lesser importance. The proportionately much more important extraluminal route is even less controllable. With intravenous, and to a lesser extent urinary catheters, emphasis is placed on the microbiological environment at, and the case of the entry point of the catheter.

In the case of respiratory intubation the tube passes through or very close to the oropharynx which is very heavily colonize with potential pathogens even in its normal state, and significantly more so in severely debilitated patients who need to be intubated. When the "artificial" or "iron lungs" was used for the support of victims of poliomyelitis whose respiratory muscles were paralysed, the patients did not need to be intubated and LRI was less common. There is no doubt that, in the case of modern respiratory support, the endotracheal tube must be blamed as a major cause of Ial. Despite procedures and policies designed to limit cross-infection (for example, wearing gloves, and scrupulous aseptic technique when caring for the tube and sucking our sections) infections, eventually, inevitable. They are in the main autogenous self-infections secondary to colonizations that may have been initiated as a result of cross-infection. The best that can be done is to delay their onset and then to treat them as they arise.

The outlook is less bleak for the prevention of infections among patients who are intubated briefly for anesthesia during surgery. In these cases simple preventive measures such as early postoperative mobilization, breathing exercises and physiotherapy are usually successful.

A computer programmed to translate English to and from a foreign language was challenged to interpret the axiom "out of sight, out of mind", first in one direction, then back again. After the double transfer the words re-emerged as "blind idiot"!

As a general rule, healthcare workers tend to play down or ignore the accidental harm that sometimes complicates their daily activities, even though, with a little thought, at least some of it is avoidable. There are none so blind as those who (subconsciously) do not wish to see!

Chapter 4. WOUND MANAGEMENT

Stoma care

After learning this chapter, you will be able to:

1. Define stoma
2. Identify the types of stomas
3. Establish stoma care goals.
4. Identify the stoma "normal behavior"
5. Discuss the features of post-operative stoma care
6. Discuss the importance of patient education
7. Demonstrate the ability of changing a dressing when caring for stoma.

Definition

"Stoma" is a word of Greek origin meaning "mouth" or "opening". When a patient has a diseased gastrointestinal system or dysfunctional bladder, a surgical opening must be made so that waste products can exit the body. An ostomy defines the surgically created opening, while a stoma defines the actual protruding end in the abdominal wall. Types of ostomies vary depending on the diseased area to be bypassed. A bowel or urinary stoma is usually created on the abdominal wall as a diversionary procedure because the urinary or colonic tract beyond the position of the stoma is no longer viable.

Indications

Stoma care is required for the following purposes:

1. to achieve and maintain patient comfort and security;
2. to maintain good skin and stoma hygiene.

Types of stoma

COLOSTOMY

In a colostomy the stoma may be formed from any section of the large bowel, e.g. "end" or "terminal" sigmoid colostomy.

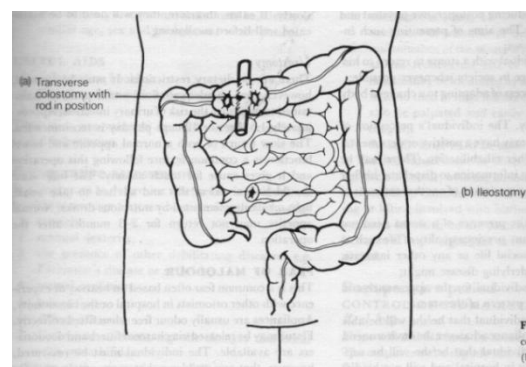
A temporary colostomy may be raised to divert the faecal output, thus allowing healing of an anastomosis further along the colon. With a loop colostomy, a rod or bridge may be used to maintain a hold on the abdominal surface. Such a rod or bridge is removed 7-10 days after insertion.

ILEOSTOMY

In an ileostomy the ileum is brought out into the abdominal wall, as when, for example, the large colon is affected by inflammatory disease.

UROSTOMY

The performance of such operations required the ureters to be transplanted from the bladder into a length, approximately 15 cm, of ileum, which has been isolated, along with its mesentery, from the remainder of the small bowel. One end of the ileum, with the resected ureters, remains inside the abdomen, while the other is brought out on the abdominal wall and everted to form a slightly protruding stoma.



Recognizing Normal

Prior to caring for an ostomy, nurses need to recognize the normal appearance of a stoma. The protruding tissue, whether it is the large or small intestine, has high vascularity, or rich blood supply. This produces a pink to bright red and shiny appearance to the stoma. A pale pink stoma indicates low hemoglobin* and hematocrit** levels, while a purple to black stoma indicates compromised circulation requiring immediate notification to the doctor, according to the book "Medical-Surgical Nursing."

Additionally, note that the type of drainage exiting the ostomy depends on the area of surgery. For colostomies, expect liquid stool from the ascending colon, loose to semiformal stool from the transverse colon and normal stool from the descending colon, notes Drugs.com. Expect that liquid stool is normal from an ileostomy and clear yellow urine along with mucus created by the intestinal walls from a urostomy.

*Hemoglobin (Hb) is the protein contained in red blood cells that is responsible for delivery of oxygen to the tissues

**The *hematocrit* measures the volume of red blood cells compared to the total blood volume (red blood cells and plasma).

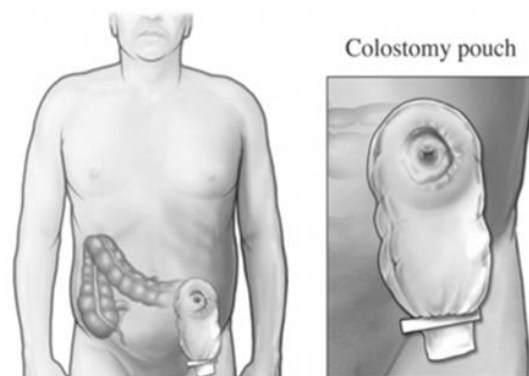
Post-Operative Care

A new stoma must be kept moist to ensure tissue integrity, so the nurse should place a petrolatum gauze over the stoma. As soon as possible, a pouch system needs to be placed over the ostomy and monitored for proper fit and signs of leakage. Besides monitoring the stoma color, the nurse needs to continuously assess functioning of the stoma and notify the physician of complications such as stoma retraction, unusual bleeding or presence of necrotic tissue and compromised stoma vasculature. Waste matter should never be allowed to remain on the skin, so nurses should diligently empty an ostomy pouch when one-third full and perform skin care on the peristomal area. According to the National Kidney and Urologic Diseases Information Clearinghouse, urostomies can get infected, so nurses should monitor and teach the patient signs of symptoms of infection. These are dark urine with foul odor, increased mucus in urine, lower back pain, nausea and vomiting.

Patient Education

"Ostomy Wound Management" reports that educating the patient is the most significant step in preventing ostomy complications. During the hospitalized period and prior to discharge, nurses should educate the patient on different pouching systems, how to empty and change the pouch, self-irrigation of a colostomy if appropriate, as well as proper skin care around the stoma.

Besides physical aspects, nurses should identify psychosocial concerns the patient has regarding an ostomy. According to the UOAA, the patient may experience self-esteem issues due to a change in body image and worry about self-managing an ostomy. They may also develop an apprehension about the effects of the stoma on their sexuality and other social relationships. It is important for the nurse to let patients express their concerns, provide information and help as well as remember to let patients adjust in their own way and in their own time.



Chapter 5. PROCEDURES

Bowel Care

After learning this chapter, you will be able to:

1. Define enemas
2. List indications for enemas
3. List contraindications for enemas
4. Identify the enemas types
5. Compare different types of enemas
6. Identify the principles of choosing fluid for enemas.
7. Identify some potential problems related to the enemas introduction
8. Rationale solutions suggested for particular problems related to giving enemas.
9. Apply the acquired skills to particular situation.

General Introduction

It should be born in mind that many patients are too embarrassed to talk about bowel function and will often delay reporting the problem until it has been present for a few days. Generally complaints will be either that the patient has diarrhea or that he/she is constipated. Both diarrhea and constipation should be seen as symptoms of some underlying disease or malfunction and managed accordingly.

Constipation

Constipation is a symptom. Its management depends on its cause. Definition and classification differ but for most patients it means irregular, infrequent defaecation associated with the passage of hard faeces. The patient usually complains of difficulty in defecating with accompanying discomfort or pain.

Traditionally, the treatment of constipation has been left to the nurse. As the patient often presents in hospital with an acute problem of constipation, nurses will need to formulate a short-term plan to evacuate the bowel as completely and as quickly as possible. For this reason enemas, suppositories and laxatives have remained the treatments of choice.

Enemas

Definition

An enema is the introduction into the rectum or lower colon of a stream of fluid for the purpose of producing a bowel action or instilling medication.

Indications

Enemas may be prescribed for the following reasons:

1. To clean the lower bowel prior to surgery or childbirth, prior to X-ray examination of the bowel using contrast medium, prior to endoscopy examination or in cases of severe constipation;
2. To introduce medication into the system;
3. To soothe and treat irritated bowel mucosa;
4. To decrease body temperature (due to contact with the proximal vascular system)
5. To stop local haemorrhage
6. To reduce hyperkalaemia (calcium resonium)
7. To reduce portal systemic encephalopathy (phosphate enema).

Contraindications

Enemas are contraindicated under the following circumstance:

1. Cases of paralytic ileus;
2. Cases of colonic obstructions
3. The administration of tap water or soap and water enemas which may cause circulatory overload, water intoxication, mucosal damage and necrosis, hyperkalaemia and cardiac arrhythmias;
4. The administration of large amounts of fluid high into the colon which may cause perforation and haemorrhage;
5. Following gastrointestinal or gynaecological surgery, where suture lines may be ruptured (unless medical consent has been given).

Types of enemas

Evacuant enemas

An evacuant enema is a solution introduced into the rectum or lower colon with the intention of its being expelled, along with faecal matter and flatus, within a few minutes. The following solutions are commonly used:

1. Phosphate enemas with standard or long rectal tubes in single-dose disposable packs
2. Dioctyl sodium sulphosuccinate 0.1%, sorbitol 25%, in single-dose disposable packs;
3. Sodium citrate 450mg, sodium alkylsulphoacetate 45 mg, sorbic acid 5 mg in single-dose disposable packs
4. Tap water.

Enemas containing dioctyl sodium sulphosuccinate lubricate and soften impacted faeces. Phosphate enemas are useful in bowel clearance prior to X-ray examination and surgery.

Tap water may be dangerous when administered as an enema to a child or to those with poor cardiac function as excessive absorption could lead to circulatory overload.

Retention enemas

A retention enema is a solution introduced into the rectum or lower colon with the intention of its being retained for a specified period of time.

Three types of retention enema are in common use:

1. Arachis oil (may be obtained in a single-dose disposable pack)
2. Olive oil
3. Prednisolone.

Enemas containing olive oil will soften and lubricate impacted faeces. Retention enemas give to administer medication will be prescribed by the doctor. The product must be checked with the prescription before its administration.

Rectal lavage

Rectal lavage is the washing out of the rectum using large volumes of non-sterile fluid.

Indications

Rectal lavage is performed for the following purposes:

1. to clear the lower bowel prior to investigation by barium enema and thus enable good images to be obtained;
2. to assist in clearing the lower bowel prior to major abdominal surgery and thus decrease the risk of infection and aid satisfactory healing;
3. to clean the lower bowel of residual faecal matter following previous surgery, e.g. formation of colostomy.

Contraindications

Rectal lavage is contraindicated in patients who have a history of any one of the following:

1. severe or prolapsed haemorrhoids
2. anal fissure
3. inflammatory bowel disease
4. large tumour in the rectum or sigmoid colon
5. post-radiation proctitis
6. internal fistulae

7. previous extensive deep X-ray therapy to the pelvis
8. recent bowel surgery
9. congestive cardiac failure
10. impaired renal function.

In 1-8 of the contraindications listed above, the reason for employing caution is because of the damage that could be inflicted by the mechanical aspects of rectal lavage. When the bowel has been traumatized there is a greater potential risk of causing irritation or, in extreme cases, perforation, while inserting the catheter and running large volumes of fluid in and out of the rectum.

With the last two contraindications the potential risk lies with the possibility of large amounts of fluid and/ or electrolytes becoming absorbed through the bowel. (Generally speaking with the amounts and type of fluid used and the relatively short time that it stays in the bowel, it should not present a major problem).

Choice of fluid

Several solutions can be used to clear the bowel.

Soap solutions

Soap solutions can be made from either "hard" soap, i.e. from olive oil and sodium hydroxide, or "soft" soap, which is a combination of potassium and vegetable products. Soft soaps are more irritating than hard soaps and the usual dilution is 5 ml of soap in 1000 ml or more of water. Soap solutions stimulate peristalsis by chemical irritation and intestinal distention. However, they can also cause a whole range of symptoms, which extends from simple hyperaemia to gangrene and the occasional fatality.

Soap solutions are unsuitable for use prior to bowel surgery or rectal examination because of their effect on the mucosa, and some research leaves much doubt as to whether they are of any real value.

Hypertonic solutions

Hypertonic solutions, e.g. sodium phosphate and sodium biophosphate in solution, act by drawing water from the intestinal cells by osmosis. This increases the fluid in the faecal mass, causing first distention then contraction and defaecation.

For patients who have a large amount of faecal matter to evacuate, small volumes of these solutions are very effective. Hypertonic solutions should not be given to patients whose capacity to utilize sodium is affected as some sodium may be absorbed. These are available as commercially prepared enemas but are not suitable for administration in large volumes.

Tap water

Rectal lavage is a procedure that is normally used in combination with other methods of clearing the bowel, e.g. oral aperients and dietary restrictions. In this situation, it can be anticipated that there will be very little residue remaining in the lower bowel. What is needed, therefore, is a simple, non-sterile solution that can be used with relative safety in large volumes to wash out the residual faecal matter. The solution which fulfils these criteria ideally is tap water.

Rectal lavage using tap water is not without risk as large volumes of this hypotonic solution can upset the patient's electrolyte balance. Water is drawn by osmosis into the intestinal cells and water intoxication can result with symptoms of weakness, sweating, pallor, vomiting, coughing, and dizziness. However, this is a relatively rare complication and generally tap water is very well tolerated.

The other advantages of tap water are as follows:

1. it is cheap and easily available
2. it can be easily warmed to the correct temperature
3. it is non-irritant to the bowel mucosa
4. it does not cause excessive peristalsis with resulting cramps and colic.

Caution should be exercised when giving tap water lavage to infants or patients with altered kidneys or cardiac reserve, but otherwise tap water is the solution of choice.

Isotonic saline

For patients with compromised electrolyte status an isotonic saline solution can be substituted. This is prepared by adding two teaspoonfuls of salt to 1 liter of plain water. Its effect on the bowel is similar to that of water in that it stimulates peristaltic action by distending the intestinal walls. With isotonic saline, however, there is less danger of electrolyte imbalance.

Nursing Care plan

Problem	Cause	Suggested Action
Unable to insert the nozzle of enema pack or rectal tube into the anal canal.	Tube not adequately lubricated.	Apply more lubrication jelly.
	Patient in an incorrect position.	Ask the patient to draw his/her knees up further toward his/her chest.
	Patient apprehensive and embarrassed about the situation.	Ensure adequate privacy and give frequent explanations to the patient about the procedure.
	Patient unable to relax his/her anal sphincter	Ask the patient to take deep breaths and "bear down" as if defaecating.
Unable to advance the tube or nozzle into the anal canal.	Spasm of the canal walls.	Insert the tube or nozzle more slowly, thus minimizing spasm.

Unable to advance the tube or nozzle into the rectum.	Blockage by faeces. Blockage by tumor	Allow a little solution to flow and then insert the tube further. If resistance is still met, stop the procedure and inform a doctor.
Patient complains of cramping or the desire to evacuate the enema before the end of the procedure.	Distension and irritation of the intestinal wall, which produce a strong peristalsis sufficient to empty the lower bowel.	Temporarily stop the insertion of fluid by clamping the tubing or lowering the funnel until the patient says the feeling has subsided.
Patient unable to open his/her bowels after an evacuant enema and the fluid has not returned.	Reduced neuromuscular responses in the bowel wall.	Insert a rectal tube and try to siphon the fluid off. Measure and record the amount. If this is not successful, perform rectal lavage.

Injections

Injection defined as the act of giving medication by use of a syringe and needle. There have been identified eight routes for the use of parental injection:

1. intra-arterial
2. intra-articular
3. intra cardiac
4. intradermal
5. intralesional
6. intramuscular
7. intravenous
8. Subcutaneous.

Site of injection

Site selection is predetermined for intra-arterial, intra-articular, intracardiac, intralesional and intrathecal injections. The choice of the remaining sites will normally depend on the desired therapeutic effect and the patient's safety and comfort.

Intradermal

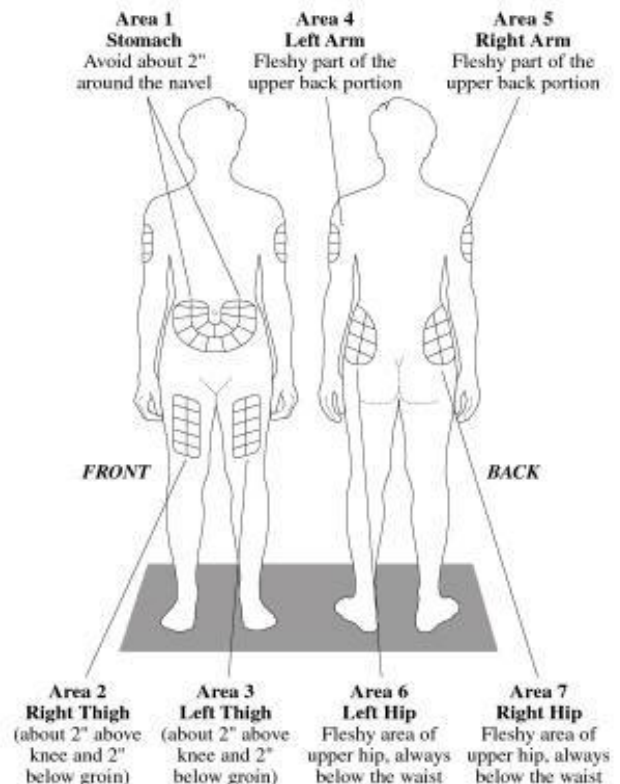
Chosen sites are the ventral forearms and the scapulae. Observation of an inflammatory reaction is a priority. So the best sites are those that are highly pigmented, thinly keratinized and hairless.

Subcutaneous

Chosen sites are the lateral aspects of the upper arms, and thighs, the abdomen in the umbilical region, the back and the lower loins. Slow absorption is a priority so ideal sites are those poorly supplied with sensory nerves. Rotation of these sites decreases the likelihood of irritation and ensures improved absorption.

Intramuscular

1. *Mid-deltoid*: used for the injection of such drugs as narcotics, sedatives, absorbed tetanus toxoid, vaccines, epinephrine in oil and vitamin B12. It has the advantage of being easily accessible whether the patient is standing, sitting or lying down. It is also a better site than the gluteal muscles for small-volume (less than 2 ml), rapid-onset injections. Because the area is small, it limits the number and size of the injections that can be given at this point.
2. *Gluteus medius* used for deep intramuscular and Z-track injections. The gluteus muscle has the lowest drug absorption rate. The muscle mass is also likely to have atrophied in elderly, non-ambulant and emaciated patients. This site carries with it the danger of the needle hitting the sciatic nerve and the superior gluteal arteries.
5. *Vastus lateralis*: used for deep intramuscular and Z-track injections. This site is free from major nerves and blood vessels. It is a large muscle and can accommodate repeated injections.



Skin preparation

Ethyl alcohol and the iodophors (such as providone-iodine) are quoted as the two most common solutions for preparing skin for injection. When using the iodophors, the nurse must check beforehand that the patient is not allergic to iodine. An iodophor must not be used to prepare the skin for an intradermal injection as the solution discolors the skin and this makes it difficult to assess any expected reaction.

When cleaning the skin, the use of friction together with a circular motion is recommended. The nurse should begin at the centre of the chosen site and progress outwards. The antiseptic must be allowed to dry thoroughly before injection; otherwise the antiseptic may be forced into the tissue with the injection.

Needle size

When choosing the correct needle length for intramuscular injection it is important to assess the muscle mass of the injection site, the amount of subcutaneous fat and the weight of the patient. Without such an assessment, most injection intended for gluteal muscle are deposited in gluteal fat.

Deltoid and vastus lateralis muscles

The muscle to be used should be grasped between thumb and forefinger to determine the depth of the muscle mass or the amount of subcutaneous fat at the injection site. One half of the distance between thumb and forefinger will be the appropriate length of the needle required to penetrate into that muscle.

Gluteal muscles

The layer of fat and skin above the muscle should be gently lifted with the thumb and forefinger for the same reasons as before. Use the patient's weight to calculate the needle length, required. There have been recommended the following guide

31.5-40 kg	2.5-cm needle
40.5-90 kg	5-7.5-cm needle
90+ kg	10-15-cm needle.

Guidelines: Administration of injections

Equipment

1. Clean tray or receiver in which to place drug and equipment
2. 19G needle to ease reconstitution and drawing up
3. 21, 23, or 25G needle, size dependent on route of administration
4. Syringes of appropriate size for amount of drug to be given
5. Swabs saturated with isopropyl alcohol 70%
6. Sterile topical swab, if drug is presented in ampoule form
7. Drug(s) to be administered
8. Patient's prescription chart, to check dose, route, etc.
9. Recording sheet or book as required by law or hospital policy
10. Any protective clothing required by hospital policy for specified drugs, such as antibiotics, or cytotoxic drugs.

Procedure

Action	Rationale
1. Collect and check all equipment	To prevent delays and enable full concentration of the procedure.
2. Check that the packaging of all equipment is intact.	To ensure sterility, if the seal is damaged, discard.
3. Wash hands.	To prevent contamination of medication and equipment.
4. Prepare needle(s), syringe(s), etc. on a tray or receiver.	
5. Inspect all equipment.	To check that none is damaged, if so, discard.
6. Consult the patient's prescription sheet, and ascertain the following: Drug Dose Date and time of administration Route and method of administration Diluents as appropriate Validity of prescription Signature of doctor.	To ensure that the patient is given the correct drug in the prescribed dose using the appropriate diluents and by the correct route.
7. Check all details with another nurse if required by hospital policy.	To minimize any risk of error.
8. Select the drug in the appropriate size of container, and check the expiry date.	To reduce wastage. To prevent an ineffective or toxic compound being administered to the patient.
9. Proceed with the preparation of the drug, using protective clothing if advisable.	

Intramuscular injections

Action	Rationale
1. Explain the procedure to the patient.	To obtain the patient's consent and co-operation.
2. Assist the patient into the required position.	
3. Expose the chosen site.	
4. Clean the chosen site with a swab saturated with isopropyl alcohol 70%.	To reduce the number of pathogens introduced into the skin by the needle at the time of insertion.
5. Stretch the skin around the chosen site.	To facilitate the insertion of the needle and to displace the subcutaneous tissue.
6. Holding the needle at an angle of 90, quickly plunge it into the skin.	To ensure that the needle penetrates the muscle.
7. Pull back the plunger. If no blood is aspirated, depress the plunger and inject the drug slowly. If blood appears, withdraw the needle, replace it and begin again. Explain to the patient what has occurred.	To confirm that the needle is in the correct position. To prevent pain and ensure even distribution of the drug.
8. Withdraw the needle rapidly. Apply pressure to any bleeding point.	To prevent haematoma formation.
9. Record the appropriate documents that the injection has	

been given.

10. Dispose the equipment in the required fashion.

To ensure safe disposal and to avoid laceration or other injury to staff.

Intravenous Management

The administration of intravenous medications is an area in which the role of the nurse is being increasingly extended.

In all intravenous therapy the nurse's responsibility include the following:

1. Checking the infusion fluid and container for any obvious faults or contamination;
2. Ensuring the administration of the prescribed fluid to the correct patient;
3. Observing whether the intravenous line remains patent;
4. Inspecting the site of insertion and reporting abnormalities;
5. Controlling the rate of flow as prescribed;
6. Maintaining the condition of the patient and reporting any changes;
7. Maintaining appropriate records.

Permitted methods of intravenous drug administration by nurses were identified.

1. Continuously, or intermittently, by addition to an intravenous infusion in a bottle, bag or burette. This method may include the use of a variety of equipment, e.g. a small-volume syringe pump or a Y administration set;
2. Intermittently by injection into the latex rubber section of an intravenous administration set;
3. Intermittently by injection into a cannula or winged infusion device. The device's patency may be maintained by heparinization;
4. Intermittently by injection via a three-way tap or stopcock. This method is not advised, however, due to the increased risk of contamination associated with these devices. Streamlined adaptors are now available and are preferred.

Additional guidelines

These include the following:

1. The infusion container should not stand for more than 24 hours. This was reduced to 8 hours in the case of blood or blood products.
2. The administration set must be changed every 24 hours. More recent research indicates that a 48-hour set change is not associated with an increase in infection. It is desirable to record the time and date when this is due;
3. The site of the infusion should be inspected at least daily for complications such as infiltration or inflammation;
4. The sterile dressing covering the insertion site must be changed daily, at the time of inspection or whenever it is touched, e.g. at the time of administration of an intravenous injection.

In the light of more recent research, it is now possible to propose further recommendations. It is desirable that a closed system of infusion is maintained wherever possible, with as few connections or stopcocks, as is necessary for its purpose. This reduces the risk of extrinsic bacterial contamination, especially if three-way taps or their equivalents are excluded. The dead space in this equipment has been identified as a reservoir for microorganisms which may be released into the circulation.

The majority of sepsis is cannula related and both infective and non-infective complications have been shown to increase substantially after the device has been in position for 48 hours. Routine testing is therefore, advised if at all possible. Although the nurse is not normally responsible for this duty, he/she may be able to remind the doctor when this time has elapsed.

In order for the insertion site to be readily available for inspection, it may be necessary for the nurse to assume responsibility for taping the cannula in place as well as dressing the insertion site. Non-sterile tape should not cover the site, the equivalent of an open wound, and a method must be devised so that the site remains visible and the cannula is stable.

The purpose of all recommendations is to reduce the complications associated with intravenous therapy. Competent, informed management and adherence to basic principles will ensure this.

Removal of the intravenous device or cannula should be an aseptic procedure. The cannula must be taken out gently in order to prevent damage to the vein and pressure should be applied immediately. This pressure should be firm and not involve any rubbing movement. A haematoma will occur if the needle is carelessly removed, causing discomfort and a focus for infection. Pressure should be applied until bleeding has stopped then a light sterile dressing applied.

Advantages of using the intravenous route	Disadvantages of using the intravenous route
1. An immediate therapeutic effect is achieved due to rapid delivery of the drug to its target site. 2. Total adsorption allows precise dose calculation and more reliable treatment. 3. The rate of administration can be controlled and the therapeutic effect maintained or modified as required. 4. Pain and irritation caused by some substances when given intramuscularly or subcutaneously are avoided. 5. Intravenous administration is suitable for drugs which cannot be absorbed by any other route due to large molecular size and irritation to, or instability in, the gastrointestinal tract.	1. There is an inability to recall the drug and reverse the action of it. This may lead to increased toxicity or sensitivity reactions. 2. Insufficient control of administration may lead to speed shock. This is characterized by a flushed face, headache, congestion, tightness in the chest, etc. 3. Additional complications may occur, such as the following: (a) microbial contamination through a point of access into the circulation for a period of time; (b) Vascular irritation, e.g. chemical phlebitis; (c) drug incompatibilities and interactions if multiple additives are prescribed.

Principles to be applied throughout preparation and administration

Asepsis

Aseptic technique must be adhered to throughout all intravenous procedures to prevent extrinsic bacterial contamination (employing good hand washing and drying techniques or using an alcohol-based skin cleanser as an alternative). Injection sites should be cleaned using an alcohol-based antiseptic, allowing time for it to dry. A non-touch technique should be employed when changing infusion bags or bottles and these procedures should be completed as quickly as possible.

If asepsis is not maintained, local infection, septic phlebitis or septicaemia may result. Any indication of infection e.g. redness at the insertion site of the device or pyrexia, required removal of the cannula and further investigation.

Safety

All details of the prescription and all calculation must be carefully checked in accordance with hospital policy in order to ensure safe preparation and administration of the drugs. The nurse must also check the compatibility of the drug with the diluents or infusion fluid. He/she should be aware of the types of incompatibilities, and the factors which could influence them.

Drug should never be added to the following: blood; blood products, i.e. plasma or platelet concentrate; mannitol solution; sodium bicarbonate solution. Only specially prepared additives should be used with fat emulsions or amino acid preparations. Accurate labeling of additives and records of administration are essential.

Comfort

Both the physical and psychological comfort of the patient must be considered. By maintaining high standards throughout, the patient's physical comfort should be assured. Comprehensive explanation of the practical aspects of the procedure together with balanced information about the effects of treatment will contribute to reducing anxiety.

Methods of administering intravenous drugs

Three methods are recommended: continuous infusion, intermittent infusion and intermittent injection.

Continuous infusion

Continuous infusion may be defined as the administration of a large volume of fluid, i.e. 250-1000 ml, over a number of hours that may be repeated over a period of days. An exception of this may be a small-volume infusion (e.g. of heparin) delivered continuously via a syringe pump.

A continuous infusion may be used when:

1. The drugs to be administered must be highly diluted;
2. Maintenance of steady blood levels of the drug is required.

Pre-prepared infusion fluids with additives such as those containing potassium chloride should be used whenever possible. Only one addition should be made to each bottle or bag of fluid after the compatibility has been ascertained. The additive and fluid must be mixed well to prevent a layering effect which can occur with some drugs. The danger is that a bolus injection of the drug may be delivered. To safeguard this, any additions should be made to the infusion fluid before the fluid is hung on the infusion stand. The infusion container should be clearly labeled after the addition has been made. Constant monitoring of the infusion fluid mixture and the patient should occur.

Intermittent infusion

Intermittent infusion is the administration of a small-volume infusion, i.e. 50-250 ml, over a period of between 20 minutes and 2 hours. This may be given as a specific dose at one time or at repeated intervals during 24 hours.

An intermittent infusion may be used when,

1. a peak plasma level is therapeutically required;
2. the pharmacology of the drug dictates this specific dilution;
3. the drug is not stable for the time required to administer a large-volume infusion;
4. the patient does not require or cannot tolerate large volumes of fluid.

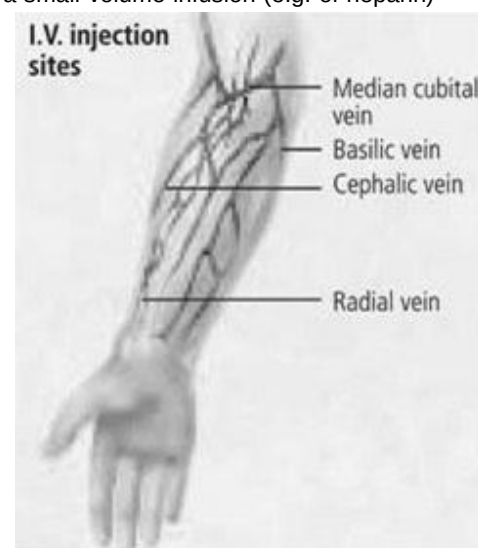
Calculations of accurate rate of administration (continuous or intermittent)

The rate of administration of a continuous or intermittent infusion may be calculated from the following equation:

$$\frac{\text{No. milliliters to be infused}}{\text{No. hours over which infusion is to be delivered}} \times \frac{\text{No. drops per milliliter}}{60} = \text{No. drops to be delivered per minute}$$

In this equation, 60 is a factor for the conversion of the number of hours to the number of minutes; the number of drops per milliliter is dependent on the administration set used and the viscosity of the infusion fluid. For example, crystalloid fluid administered via a solution set is delivered at the rate of 20 drops /ml; the rate of packed red cells given via a blood set will be calculated at 15 drops/ml.

Direct intermittent injection



Direct Intermittent injection is a procedure for the introduction of a small volume of drugs into the cannula or the injection site of the administration set using a needle and syringe. This may take a few seconds or a number of minutes. Whatever method is chosen, the same procedure should be followed. This includes the following:

1. removal of any bandage or dressing present to inspect the insertion site of the cannula;
2. confirmation of the patency of the vein and its ability to accept an extra flow of fluid or irritant chemical.

Using a heparin lock

This means maintaining the patency of the cannula using a weak solution of heparin. A plug with a resealable injection cap is inserted into the end of the intravenous device. Sufficient heparin to fill the "dead space" and of a concentration to prevent fibrin formation is injected. The cannula can then be left for a number of hours before reheparinization is required. The time is dependent on the strength of heparin used.

The advantage of using a heparin lock are as follows:

1. it reduces the risk of circulatory overload;
2. it reduces the risk of vascular irritation;
3. it decreases the risk of bacterial contamination as it eliminates a continuous intravenous pathway;
4. it increases patient comfort and mobility;
5. it may reduce the cost of intravenous equipment.

If a number of drugs are being administered, normal saline must be used to flush in between each to prevent interactions. This flush should also be repeated at the end of the administration.

The insertion site of the device should be observed throughout for swelling or redness. Patients must be constantly consulted about any pain or discomfort they may be experiencing. Problems that arise during administration will involve the vein. Patency throughout should not be assumed. Early detection of extravagation of any drug, especially in concentrated form, is essential to meet the aims of therapy.

Guidelines: Administration of drugs by direct injection

Equipment:

1. Clinically clean receiver or tray containing in prepared drugs to be administered
2. Patient's prescription chart
3. Recording sheet or book as required by law or hospital policy
4. Protective clothing as required by hospital policy or specific drugs
5. Clean dressing trolley
6. Clinically clean receiver or tray
7. Sterile needles and syringes
8. Normal saline 0.9%, 20 ml for injection
9. Heparin, in accordance with hospital policy, or a sterile intravenous stylet
10. Alcohol-based lotion for cleaning injection site
11. Hypo-allergenic tape

Procedure

Action	Rationale
1. Explain the procedure to the patient.	To obtain the patient's consent and co-operation.
2. Check any infusion in progress.	To see if it is running satisfactorily, and that the patient is not experiencing any discomfort at the site of insertion.
3. Wash hands and assemble necessary equipment.	
4. Prepare the drug for injection as per procedure.	
5. Prepare a 20-ml syringe of normal saline 0.9% for injection, as described, using aseptic technique.	
6. Draw up heparin, as required by hospital policy, and check.	
7. Place syringes in a clinically clean receptacle on the bottom shelf of the dressing trolley, along with the receptacle containing any drugs to be administered.	
8. Collect other equipment and place it on the bottom of the trolley.	
9. Place a sterile dressing pack on top of the trolley.	
10. Check that all necessary equipment is present.	To prevent delays and interruption of the procedure.
11. Wash hands thoroughly.	To maintain asepsis.
12. Proceed to the patient.	
13. Open the sterile dressing pack. Add lotion to wet the cotton wool balls.	
14. Wash hands or clean them with an alcohol-based hand wash solution.	To maintain asepsis.
15. Remove the bandage and dressing.	To observe the insertion site.
16. Inspect the insertion site of the cannula.	To detect any signs of inflammation, infiltration, etc. if present, take appropriate action.
17. Observe the infusion, if in progress, to confirm that it is running as desired. In the infusion is normal saline 0.9% with no additives, confirmation of patency and flushing with a separate syringe of normal saline are not necessary.	
18. Wash hands or clean them with an alcoholic-based hand wash	To maintain asepsis.

solution.	
19. Place a sterile towel under the patient's arm.	To create a sterile field.
20. Clean the injection site with a swab soaked in alcohol-based solution. Allow the site to dry.	To maintain asepsis.
21. Switch off the infusion or close the fluid path of a tap or stopcock.	To prevent excessive pressure within the vein. To prevent contact with an incompatible infusion fluid. To allow the nurse to concentrate on the site of insertion and injection.
22. Inject normal saline 0.9% gently.	To confirm patency of the vein. To prevent contact with an incompatible infusion fluid.
23. Use a sterile 23 or 25G needle if the injection is made through a resealable latex site.	To enable resealing of the site at the end of the injection.
24. Change syringes and inject the drug smoothly in the direction of flow at the specified rate.	To prevent excessive pressure within the vein. To prevent speed shock.
25. Observe the insertion site of the cannula throughout.	To detect any complications at an early stage, e.g. extravasation or local allergic reaction.
26. Blood return and /or "flashback" must be checked frequently throughout the injection.	To conform that the device is correctly placed and that the vein remains patent.
27. Consult the patent during the injection about any discomfort, etc.	To detect any complications at an early stage, and ensure patient comfort.
28. If more than one drug is to be administered, flush with normal saline between administrations by restarting the infusion or changing syringes.	To prevent drug interactions.
29. At the end of the injection, flush with normal saline by restarting the infusion or changing syringes.	To flush any remaining irritant solution away from the cannula site.
30. Instructions in the manufacturers' literature may specifically recommend that the drug is given into the injection site of an infusion that is running rapidly.	To increase dilution and reduce venous irritation.
31. check that the infusion fluid in progress and the drug are compatible. If not, change the fluid.	To prevent drug interaction.
32. Open the control clamp of the giving set fully, inject the drug at a speed sufficient to slow but not stop the infusion.	To prevent a backflow of drug up the tubing.
33. Observe the insertion site of the cannula carefully.	To detect any complications at an early stage. Extra pressure within the vein caused by both fluid flow and injection of the drug may cause rupture.
34. After the final flush of normal saline adjust the infusion rate as prescribed or open the fluid path of the tap or stopcock or maintain the patency of the cannula by using heparin solution or an intravenous stylet.	
35. Cover the insertion site with new sterile topical dressing and tape it in place.	To continue accurate delivery of therapy.
36. Apply a bandage.	To maintain asepsis.
37. Make sure that the patient is comfortable.	To provide support and increase the patient's comfort.
38. Record the administration on appropriate sheets.	To maintain accurate records, provide a point of reference in the event of any queries and prevent any duplication of treatment.
39. Discard waste, making sure that it is placed in the correct containers, e.g. "sharps" into a designated receptacle.	To ensure safe disposal and avoid injury to staff. To prevent reuse of equipment.

Chapter 6. INDEPENDENT PRACTICE

Pressure Sores

After learning this chapter, you will be able to:

1. Define the term "pressure sore"
2. List the contributing factors.
3. Identify the sites "at risk"
4. Rationale using risk assessment scales (The Norton one and The Waterlow one).
5. Identify the stages of pressure sore development
6. Apply the acquired skills to some particular situation.
7. Rationale the importance of the lifting techniques provided in this chapter.
8. Demonstrate the lifting skills acquired.

Definition

The term "pressure sore is used to describe any area of damage to the skin or underlying tissues caused by direct pressure or shearing forces. The extend of this damage can range from persistent erythema to necrotic ulceration involving muscle, tendon and bone.

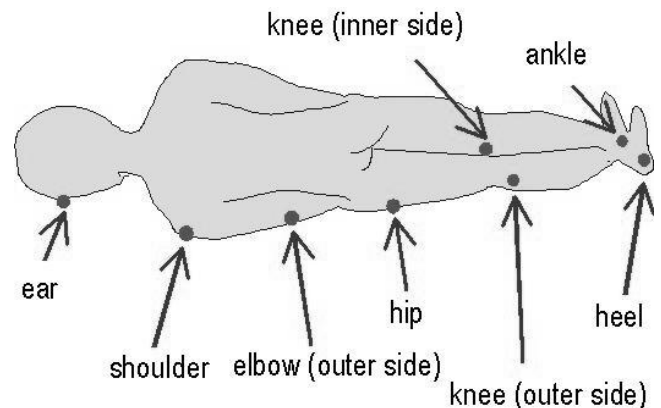
Pressure sores have probably existed since the dawn of our infirm species. They have been noted in unearthed Egyptian mummies and addressed in scientific writings since the early 1800s.

Effect of pressure on bony tissues

It is generally considered that normal capillary pressure is about 32 mm Hg. Any external pressures exceeding this will cause pressures in excess of 32 mm Hg over bony prominences while lying or sitting down. In a supine position the highest points of pressure are over the sacrum, the buttocks and the heels (40-60 mm Hg for a healthy person with a reasonable body weight: height ratio). If external pressure is intermittent, however, capillary damage does not occur. It was demonstrated that with constant pressure, even in denigrates tissues, a critical period of 1-2 hours exists before pathological change occur.

Localized pressure does not harm living tissue directly. It is compression of the capillaries that deprives the tissue of oxygen and nutrients and allows a build-up of metabolic waste, resulting in tissue death. Death is from anoxia and not from mechanical cell disruption. Reactive hyperaemia is the normal body response to pressure ischemia. After pressure is relieved the area shows a bright red flush as capillary dilation occurs to return oxygen supply and remove wastes. The triggering mechanism for this is not known. After lengthy periods of unrelieved pressure, however, irreversible pathological changes occur and reactive hyperemia becomes an insufficient compensatory system.

Relief of pressure from a body surface is the single most important factor in treating or preventing the occurrence of a pressure sore. Of prime consideration in nursing care is the positioning and regular repositioning of the patient.



The Treatment Cost of Pressure Sore

Presently, treatment of pressure sores in the United States is estimated to cost in excess of \$1 billion annually. The annual cost of treating pressure ulcers in the UK varies from £1,064 (Grade 1) to £10,551 (Grade 4). Costs increase with ulcer grade because the time to heal is longer and because the incidence of complications is higher in more severe cases. The total cost in the UK is £1.4–£2.1 billion annually.

One of the first step is to realize that this is not just a nursing problem. What is needed is a Multi-disciplinary team approach, and this team should consist of members from all areas of the Hospital. Without concerted effort the cost is likely to increase in the future as the population ages. To the extent that pressure ulcers are avoidable, pressure damage may be indicative of clinical negligence and there is evidence that litigation could soon become a significant threat to healthcare providers.

Identification of patients at risk

Risk calculators are widely used to assist in identifying those patients at risk of developing pressure sores. Whilst a risk calculated should form only part of the total assessment of the patient, it does provide an objective view of risk.

Patients should be assessed on admission so that appropriate precautions can be taken. Norton et al. (1975) developed an "at risk" scale. Patients with scores of 14 or below are considered to run the greatest risk of developing pressure sores. Patients having scores of 14-18 are not considered to be at risk but they should be reassessed immediately any deterioration in their condition is observed. Scores of 18-20 indicate patients at minimal risk.

The Norton Scale (Norton, 1975).

Physical condition	Score	Mental condition	Score	Activity	Score	Mobility	Score	Incontinent	Score
Good	4	Alert	4	Ambulant	4	Full	4	Not	4
Fair	3	Apathetic	3	Walk/help	3	Slightly limited	3	Occasionally	3
Poor	2	Confused	2	Chairbound	2	Very limited	2	Usually /urine	2
Very bad	1	Stuporous	1	Bedfast	1	Immobile	1	Doubly	1

The Waterlow Pressure Sore Risk Assessment Scoring System

It was developed as a result of research undertaken at Murgrove Park Hospital in Taunton in 1985. It was evaluated against 650 patients of all ages in medical, surgical, orthopedic and elderly care wards. At this moment in time it is believed to be the most widely used assessment tool in the UK. Various studies have been conducted comparing the Waterlow scoring system with other systems, notably the Norton Score and in all published comparisons the Waterlow score has been found to be more sensitive and comprehensive.

As a result of an assessment, patients will either be found to be "Nor at Risk" or will be put into one of three Risk Categories – At Risk – High Risk - Very High Risk.

Guidelines: Prevention of pressure sores

ACTION	RATIONALE
1. assess every patient on admission using a recognized scale, such as the Norton Scale	To identify the patient at risk of developing pressure sore.
2. Reassess every patient on a regular basis.	To maintain consistency in treatment.
3. Do not rub any area at risk.	Rubbing causes maceration and degeneration of subcutaneous tissues, especially in the elderly.
4. Wash areas at risk only if the patient is incontinent or sweating profusely. Use mild soap or a liquid detergent. Ensure that all detergent or soap is rinsed off and that the area is patted dry. Use moisturizer if the skin is very dry. Ask the patient what suits his/her skin.	To maintain skin integrity and prevent the formation of sores. Excessive use of soap can be harmful to the skin. Through gently drying of the skin promotes comfort and discourages the growth of micro-organisms. Dry skin cracks to allow entry of micro-organisms.
5. Use barrier creams only when indicated.	Barrier creams prevent damage to the epidermis. They are, however, occlusive and prevent correct moisture and oxygen exchange from the skin.
6. Encourage the patient to eat a nutritious diet, rich in protein and vitamin C.	Deficiencies of protein and vitamin C have been shown to render an individual more prone to pressure sores.
7. Educate the patient to shift position, to pull or push up regularly and to examine the vulnerable area.	After discharge the patient will be self-caring and possibly still vulnerable to sores. To encourage the patient to participate in his/her own care.
8. Initiate a mobility program for the patient. Call on the physiotherapist or occupational therapist as appropriate.	Reduces further tissue damage and improve circulation.
9. Use appropriate pressure relief devices.	Use of inappropriate aids may increase pressure to that area.
10. Have the patient recumbent whenever possible. Support with head bags or pillows in bed. Reduce period spent sitting in chair if pelvic sores develop.	Avoid the use of bedrests as these increase shearing.

Healing stages of a clean incision

Stage 1 – the phase of traumatic inflammation is 0-3 days.

Stage 2 – The destructive phase is 1 - 6 days

Stage 3 – The proliferative phase, 3 - 20 days

Stage 4 - The maturation phases are 20 days to 2 years.

Wound healing and repair is a continuous process, so naturally these stages overlap to some extent.

Lifting

The aim of successful lifting is to achieve the required results with minimal effort by the lifter and minimal discomfort to the patient. By fully assessing every situation in which it is necessary to lift, both patient and staff can be protected from injury.

Biomechanics of lifting

The spine is capable of bearing large compression forces but is vulnerable to damage from shearing forces along the surface of the discs as well as torsional and twisting forces. Structural damage to the cartilaginous structures may occur as the result not only of one bad lifting experience, but also from continual poor posture or repeat lifting of comparatively light objects in an incorrect manner.

If the trunk is nearly erect, most of the weight of the upper body and the lifted load is directly down through the vertebral column, stabilizing it and causing some compression of the discs. If, however, the trunk is horizontal, these weights produce a shearing force, rather than compression, on the discs.

The erector spinae muscles which provide some of the tension support of the spine during lifting are able to exert greater force lifting a given weight when the spine is in the upright rather than flexed position.

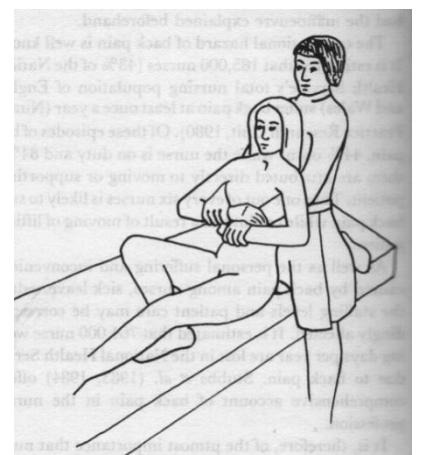
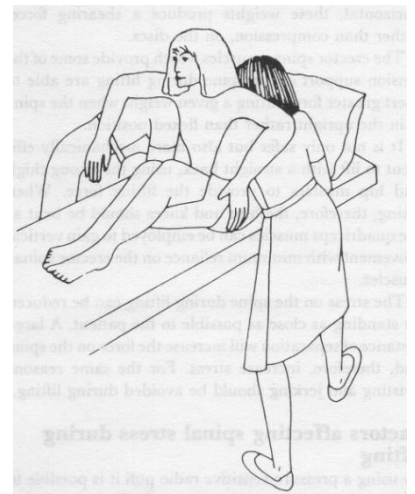
It is not only safer but also more mechanically efficient to lift with a straight back, using the strong thigh and hip muscles to provide the lifting force. When lifting, therefore, the hips and knees should be bent as the quadriceps muscles can be employed to gain vertical movement with minimum reliance on the erector spinae muscle.

The stress on the spine during lifting can be reduced by standing as close as possible to the patient. A large distance of separation will increase the forces on the spine and, therefore, increase stress. For the same reasons twisting and jerking should be avoided during lifting.

The lifting technique

The stress experienced by the spine when lifting is largely affected by the technique used. However, skilful the lifter may become, he/she must always recognize his/her limitations and get further assistance when necessary.

The shoulder (Australian) lift



If a hoist is not available this is the lift of choice/ although it is not suitable for patients with rib or shoulder injuries. It is particularly valuable when lifting heavy patients as using the shoulders gives the lifter a mechanical advantage. The patient sits forward and both nurses stand level with the patient's hips. The foot nearer the head of the bed points in the direction of the lift and the knees and hips are bent, keeping the back straight and the head up.

The nurses press their near shoulder against the chest wall under the axillae and, if possible, the patient rests his/her arms on the nurses' backs. One nurse grasps the other's forearm well up under the patient's thighs. The lift is then accomplished by pressing the free hand on the bed, straightening the hips and knees and transferring weight on to the forward leg.

This technique may be used for lifting the patient up and down the bed, or from the bed to the chair or commode, for example.

The through arm lift

The nurse stands behind the patient, who is in the sitting position, and places his/her arms under the patient's axillae. The nurse then grips the patient's forearms as near to the wrists as possible by placing his/her hands between the patient's chest and upper arms. The patient is asked to grip one of his/her own wrists firmly.

The other nurse faces the patient and puts his/her arms under the patient's thighs from opposite sides so that the nurse can grab his/her own wrist. The lift is performed by the nurses extending their hips and knees while keeping their backs straight.

This lift does put unequal strain on the nurses and the one who lifts the upper part of the patient experiences higher spinal stress. However, it is useful procedure, for example, moving a severely disabled patient from chair to bed. It may also be used to lift a patient from the floor and in this situation one nurse stops the patient's feet from slipping, while the other lifts with a through arm grip.

Chapter 7. FIRST AID

The term "first aid" refers to the immediate care that is provided to an injured or sick person. It is used to stabilize a patient until further medical treatment and assessment can be provided at a hospital or care facility. In 1877, St. John Ambulance (an international charity based in England) was founded, and taught first aid in mining districts and railway centers. First aid is helpful in treating broken bones, heart attack, stroke, and in childbirth. The compressions and breaths that you apply will be different for infants and adults.

Cardiopulmonary Resuscitation

After learning this chapter, you will be able to:

1. Identify indications for (CPR)
2. Rationale of the main steps of CPR
4. Demonstrate the skills required for CPR to provide
5. Compare different types of bleeding
6. Rationale the interventions for vein bleeding and artery bleeding to stop.
7. Apply aseptic technique when controlling bleeding.

Definition

Cardiopulmonary resuscitation (CPR) the manual application of chest compressions and ventilations to patients in CARDIAC ARREST, done in an effort to maintain viability until advanced help arrives

Indications

Indications of cardiac arrest are as follows:

1. Sudden loss of consciousness;
2. Absence of radial, femoral and carotid pulses
3. Cessation of respirations
4. Dilatation of the pupils
5. marked cyanosis.

Reference material

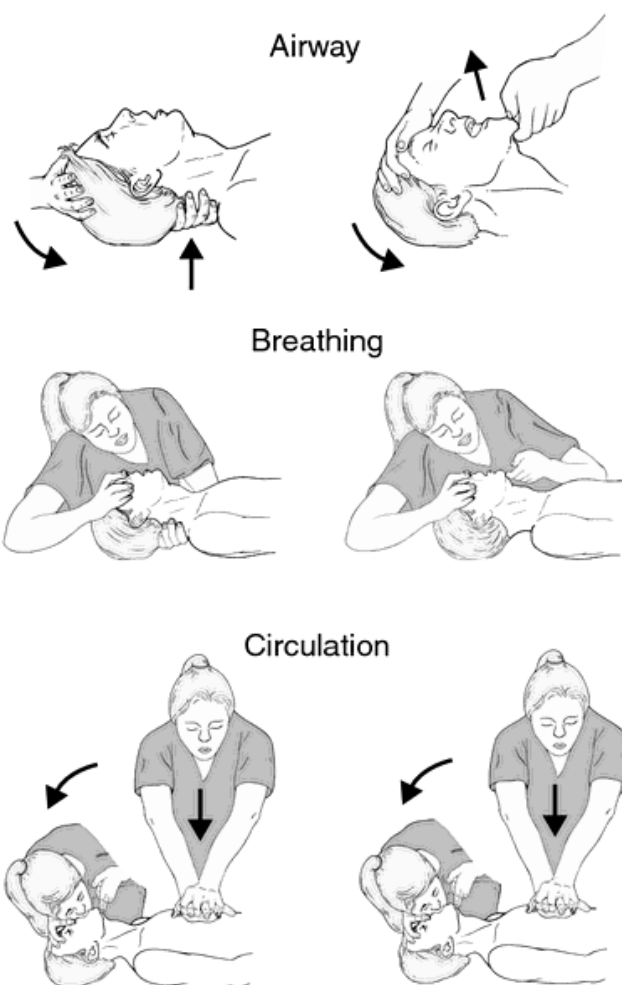
Principles

The primary objectives of cardiopulmonary resuscitation are twofold:

1. to restore effective circulation and ventilation
 2. To prevent irreversible cerebral damage due to anoxia*.
- When the heart fails to maintain the cerebral circulation for approximately 4 minutes, the brain may suffer irreversible damage.

*Anoxia - a condition characterized by an absence of oxygen supply to an organ or a tissue.

Resuscitation consists of meeting the following needs (ABS sequence):



1. A (irway) is met by maintaining an open, clear airway:
2. B(reathing) is met by maintaining artificial ventilation:
3. C(irculation) is met by maintaining external cardiac massage.

The preliminary steps of CPR are

- (1) calling for help;
- (2) establishing unresponsiveness in the victim by tapping or gently shaking and shouting at him or her;
- (3) positioning the victim in a supine position on a hard surface;
- (4) giving two breaths; and
- (5) checking the pulse.

These are begun as quickly as possible; prompt action is essential for successful outcome. At the moment breathing and heart action stop, "clinical death" ensues. Within four to six minutes the cells of the brain, which are the most sensitive to lack of oxygen, begin to deteriorate. If breathing and circulation are not restored within this period of time, irreversible brain damage occurs and "biological death" takes place.

Once it has been established that a person is in need of CPR, the rescuer immediately begins the "ABC's" of CPR: Airway, Breathing, and Circulation.

1. Opening the airway and determining by look, sound, and feel is the first step for determining whether the person will be able to resume unassisted breathing. This is accomplished by lifting the chin up and back and bringing the mandible forward. If there is no evidence of spontaneous breathing, the rescuer corrects obstruction of the airway by a foreign body, when this is indicated. This is done by one or more of the following methods: back blows, manual chest thrusts, and finger sweeps.
2. Once the airway is open, rescue breathing is started by means of mouth-to-mouth resuscitation.
3. The third element of CPR is circulation, which begins by establishing the presence or absence of a pulse. If there is no pulse, compression of the chest is begun. This consists of rhythmic applications of pressure on the lower half of the sternum. For a normal-sized adult, sufficient force is used to depress the sternum about 4 to 5 cm (1½ to 2 in). This raises intrathoracic pressure and produces the output of blood from the heart. When the pressure is released, blood is allowed to flow into the heart. Compressions should be maintained for one-half second; the same length of time is allowed for the relaxation period.

Chest compression is always accompanied by rescue breathing. The two must be coordinated so that there is regular and uninterrupted circulation of blood and aeration of the lungs.

Turning ABC to C-A-B

In 2010, the American Heart Association changed its long-held acronym of ABC to CAB — circulation, airway, breathing — to help people remember the order to perform the steps of CPR. This change emphasizes the importance of chest compressions to help keep blood flowing through the heart and to the brain.

Bleeding Control

Techniques For Severe Bleeding to Stop

The circulatory system is made up of the vessels and the muscles that help and control the flow of the blood around the body. This process is called circulation. The main parts of the system are the heart, arteries, capillaries and veins. As blood begins to circulate, it leaves the heart from the left ventricle and goes into the aorta. The aorta is the largest artery in the body. The blood leaving the aorta is full of oxygen. This is important for the cells in the brain and the body to do their work. The oxygen rich blood travels throughout the body in its system of arteries into the smallest arterioles. On its way back to the heart, the blood travels through a system of veins. As it reaches the lungs, the carbon dioxide (a waste product) is removed from the blood and replaced with fresh oxygen that we have inhaled through the lungs.

Direct pressure

Severe bleeding of an open wound can usually be controlled by pressing with the palm of one hand to compress a cloth over the entire area of the wound. A thick pad of sterile gauzes is preferable, but any soft clean cloth can be used in an emergency. Even unclean material can be used, but only if nothing better is immediately available.

In an emergency in the absence of compresses, the bare hand or fingers may be used; but only until a compress can be applied.

Don't disturb the blood clots that form in the cloth.
If blood soaks through the entire compress, do not remove it; add thicker layer of cloth and continue direct pressure.

The reason for applying hand pressure directly is to prevent loss of blood from the body without interfering with normal-blood circulation. The first-aider is handicapped in carrying out other emergency care, and if such care is necessary, the compress should be secured in place by a pressure bandage.

Elevation

Unless there is evidence of a fracture, or severely bleeding open wound of the head, neck, arm, or leg should be elevated – that is raised above the level of the victim's heart. Elevation uses the force of gravity to help reduce the blood pressure in the injured area and thus aids in slowing down the loss of blood through the wound opening. However, direct pressure on a thick pad over the wound must be continued.

Pressure on the Supplying Artery

If direct pressure and elevation do not stop severe bleeding from an open wound of the arm or leg, the pressure point technique may be required. This technique involves applying pressure at a specific point on the arm or leg to temporarily compress the main artery supplying blood to the affected limb. There is one recommended pressure point on each arm and leg.

The use of pressure point not only stops blood circulation to the injured limb. Therefore pressure points should not be used unless the technique is absolutely necessary to help stop severe bleeding. The brachial artery in the biceps and triceps is pressured when the wound is not the arm, while the femoral artery just in front of the thigh just below the middle of the crease of the groin where the wound is located in the lower extremities.

Tourniquet

It is only used when all the other methods failed in stopping the severe bleeding. Do not use a narrow band, rope, or wire. Application of a tourniquet can control severe bleeding from an open wound of the arm or leg but is rarely needed and should not be used except in critical emergency where direct pressure on the appropriate pressure point fails to stop bleeding. The uses of tourniquets are dangerous. Properly applied, it will stop all blood circulation to a limb beyond the point of application. But if it is left in place for an extended period of time, uninjured tissues may die from lack of blood and oxygen. Releasing the tourniquet tends to increase the danger of shock, and bleeding may resume. If a tourniquet is applied improperly (too loosely), it will not stop arterial blood flow to the affected limb, but will only slow or stop venous blood flow from the limb. The result is increased bleeding, instead of the controlled bleeding from the wound.

Conclusion

The general aspects of the nursing being considered in this text-book (The Nursing Process, Infection Control, Wound Management, Procedures, Independent Practice) are believed to contribute not only to the development of the fundamental practical skills required to provide a good care to the patients. Getting insight into the modern nursing as a profession is thought to help students-doctors, after graduating, to establish an effective partnership with nurses to contribute further to the better nursing care.

Таким образом, освоение основных разделов, изложенных в этом пособии (сестринский процесс, инфекционная безопасность, управление ранами, процедуры, независимая практика) позволит среднему медицинскому персоналу овладеть основными навыками ухода за больными, а врачам - в большей степени представить характер и объем работы среднего медицинского персонала, а также в достаточной степени овладеть навыками ухода, что позволит не только лучшему взаимопониманию между врачами и медицинскими сестрами и лучшей координации их деятельности, усилит практическую подготовку врачей, но и будет способствовать более эффективному менеджменту в лечебно-профилактических учреждениях.

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Review questions and the key

1. A nursing diagnosis is a nurse's:
 1. Actual nursing intervention
 2. Proposed plan of care
 3. Assessment of client data
 4. Identification of the client's health problems
2. Nursing process can be defined as the:
 1. Activities a nurse employs to identify a nursing problem
 2. Process the nurse uses to determine nursing goals
 3. Steps the nurse employs in planning and giving nursing care
 4. Implementation of nursing care by the nurse
3. One of the rationales for being unable to insert the nozzle of enema pack or rectal tube into the anal canal is
 1. Blockage by faeces.
 2. Reduced neuromuscular responses in the bowel wall.
 3. Spasms of the canal walls
 4. Tube not adequately lubricated.
4. The most important aspect of hand washing is:
 1. Water
 2. Soap
 3. Friction
 4. Time
5. The main idea of the Maslow' theory is:
 1. every human being has some needs
 2. every human need should be met
 3. the needs of the higher level dominate the needs of the lower levels
 4. if the base-level needs are not satisfied, it is difficult to meet higher-level needs
6. A nurse performing cardiac compressions on a client is aware that it is essential to exert a vertical downward pressure, which depresses the lower sternum at least:
 1. 1,3 to 2 cm
 2. 2 to 2,5 cm
 3. 2,5 to 4 cm
 4. 4 to 5 cm.
7. A client with pyrexia will probably demonstrate:
 1. Dyspnea
 2. Elevated blood pressure
 3. Increased pulse rate
 4. Precordial pain
8. .The most sensitive time for detecting pyrexias appears to be:
 1. Between 4pm and 8 pm
 2. Between 7pm and 8 pm
 3. between 5pm and 6 pm
 4. in the morning
9. The determining factor in the revision of a nursing care plan is the:
 1. Correctness of the original diagnosis
 2. Method for providing care
 3. Time available for care
 4. Effectiveness of implementation
10. In charting notes describing a client's heart rate, the nurse uses the term bradycardia. This describes:
 1. A grossly irregular heartbeat
 2. A heart rate of over 90 per minute
 3. A heartbeat that has regular "skipped" beats
 4. A heart rate of under 60 per minute.
11. Intravenous orders for a client state that he is to receive 1000 ml of fluid every 8 hours. If the equipment delivers 15 drops /minute, the nurse should regulate the flow at approximately:
 1. 60 drops/min
 2. 15 drops/min
 3. 23 drops/min
 4. 31 drops /min
12. A client is to have an enema. The rectal catheter should be inserted:
 1. 5 cm
 2. 10 cm
 3. 15 cm
 4. 20 cm
13. Pulse pressure is the:
 1. Difference between the apical and radial rates
 2. Force exerted against an arterial wall
 3. Degree of ventricular contraction in relation to output
 4. Difference between systolic and diastolic readings.

14. A good nursing care plan for an obese female client of 75-year-old with a fracture of the neck of the femur that she be turned every 2 hours. This is necessary mainly to:
1. Keep the client comfortable
 2. Prevent pressure sore
 3. Improve circulation in the lower extremities
 4. Prevent flexion contractures of all the extremities.
15. A nursing diagnosis is:
1. Hypertension
 2. High Risk for Infection
 3. Glaucoma
 4. Arthritis.
16. To begin the nursing process, the nurse must first:
1. State the client's nursing needs
 2. Identify goals for nursing care
 3. Obtain information about the client
 4. Evaluate the effectiveness of nursing actions
17. During administration of the enema the client complains of intestinal cramps. The nurse should:
1. Give at a slower rate
 2. Lower the height of the container
 3. Stop until cramps are gone
 4. Discontinue the procedure
18. The physician performs a colostomy. Postoperative nursing care should include:
1. Having a client change her own dressing
 2. Keeping the skin around the stoma clean and dry
 3. Limiting fluid intake
 4. Withholding all fluids for 2 hours
19. Because the patient's skin is extremely dry, flaky, wrinkled, sagging, and sallow, an important nursing measure is to:
1. Avoid daily bathing but use emollients
 2. Bathe her once or twice a week and use emollients
 3. Bathe when necessary and use emollients
 4. Use emollients for skin care.
20. What can help the nurses to determine the priorities of patient care:
1. nurse's competence
 2. The knowledge of the nursing process
 3. the knowledge of the human being needs
 4. the skills of developing nursing plan

The Key to the Questions:

1-4, 2-3, 3-4, 4-3, 5-4, 6-4, 7-3, 8-2, 9-4, 10-4, 11-4, 12-2, 13-4,14-2, 15-2, 16-3, 17-3, 18-2, 19-3, 20-3.