

Nursing Care in Cardiovascular Surgery—(2)

by

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TREATMENT—Histamine Therapy

HISTAMINE dilates the small blood vessels. The patient receives an injection into an artery of 2.75 mg. of histamine phosphate in 250-500 c.c. of glucose or saline solution, often in conjunction with papaverine and an antibiotic. Selective vasodilatation is thus produced in areas where circulation is uncertain and the extremity endangered.

Arterial injection can be repeated at two or three day intervals for several weeks. A single injection may be spread over 48-72 hours through the use of a special catheter (Abbott's intracath or venocath) introduced into the artery through cutdown technique.

Histamine therapy has produced excellent results in some cases by healing small gangrenous areas and relieving local discomfort. It has even been instrumental in avoiding amputation. The treatment can be repeated at the end of a few months if the condition of the limb warrants it. This is especially advantageous in instances where surgery cannot be attempted because of advanced age or poor physical condition.

Possible danger

A sudden drop in blood pressure which can be detrimental to the myocardium and may result in an infarct is the main concern. When too great a quantity of histamine is released into the general circulation, either as the result of too rapid injection or because of extensive arterial obliteration, the drug eventually reaches the heart in too great a concentration. A very sudden drop in arterial blood pressure must be avoided at all costs; uncontrolled circulatory imbalance can have serious repercussions on the heart and the brain (anoxia).

The nurse's responsibilities

1. Recognise the danger inherent in this form of treatment (hypotension) and

the means of avoiding it—a decreased rate of injection of the solution.

2. Do not leave the patient alone while the injection is under way. If the attending nurse must be relieved, she must make sure that her replacement is familiar with the treatment, its danger and the means of coping with it.

3. Check with the doctor concerning the level of blood pressure to be maintained.

4. Blood pressure and pulse should be checked every two minutes at the beginning of the injection, then every five to ten or fifteen minutes.

5. If the blood pressure drops below the level set, slow the rate of the drip. The usual rate is 30-40 gtt. per minute. Less histamine means less vasodilatation and consequently more blood goes to the heart and brain while the blood pressure is being stabilized.

6. Since this is an intra-arterial injection, the solution must be given under pressure greater than that within the artery. This is produced by creating a vacuum in the bottle connecting with the solution.

The fact that the needle is correctly positioned in the artery can be verified by checking for arterial pulsation around the needle. A spurt of blood surging back up the tubing warns that the pressure of the flow of solution has dropped. Without adequate pressure to ensure proper flow, blood is likely to coagulate in the needle, depriving the patient of life-giving therapy. It is equally important to avoid accidental injection of the solution into adjacent tissues should the needle slip out of position. Subsequent tissue reaction, especially in the area of the femoral artery where only a very short section is available for puncture, can delay further histamine injection for several days.

When the intravenous injection has been completed, the needle must be withdrawn quickly and pressure applied over the injection site for several minutes in order to prevent a hematoma which would prevent further treatment. When a small calibre intra-arterial catheter is in use, constant supervision is necessary to prevent blood coagulation in it. The same principle in relation to arterial pressure and solution pressure is applicable.

It is interesting for the nurse to observe the effects of treatment. The patient is conscious of the sensation of warmth that envelops the limb and can be very specific concerning the level that it reaches. The level of skin flushing changes

with progressive improvement in the circulation to the extremity. At first, flushing may extend only to the knee, then to mid-leg or down to the heel and even into the foot itself. The nurse should note all details carefully, such as the time of appearance of colour changes—35th, 46th minute, etc.—as well as signs of fatigue, pain, numbness.

Anticoagulant Therapy

This form of treatment is sometimes prescribed to prevent thrombosis or at least to prevent extension of it.

Anticoagulants are dangerous. Their action is not identical in all patients. Certain fundamental precautions should be observed in administration. To avoid errors in dosage when the drug is ordered intravenously, a tuberculin syringe provides a more exact measurement. The measured dose should be checked against the written order; it should be administered at the time indicated; it should be charted only after it has been injected or, if it is in an oral form, after ensuring that the patient has swallowed it.

If, in spite of all precautions, an error does occur—or even if you only *think* that one has been made—notify the attending physician immediately, watch the patient very closely. It is human to err but unnecessary to endanger a patient's life through silence.

SURGERY

Sympathectomy

The sympathetic nervous system distributes vasoconstrictor nerve fibres to the entire periphery of the body. These fibres have a vasoconstrictive action on most blood vessels and a stimulating action on sweat glands. Sympathectomy, which involves excision of a portion of the sympathetic nervous system, both ganglia and nerve fibres, is often the treatment of choice, sometimes

the *only* form of surgical intervention that can be undertaken.

The operation results in suppression of vasoconstrictive action and marked peripheral vasodilatation. The area formerly affected by these nerve fibres becomes warm and dry. The nurse will find it interesting to observe the colour and temperature changes in the extremities post-operatively.

Obliterative Vascular Conditions

Relief measures include: endarterectomy, thrombo-endarterectomy, thrombectomy and grafting, either by autogenous grafts (using the internal saphenous vein) or by replacement with synthetic materials such as Dacron and Teflon.

The surgical problem is the removal of gross obstruction to circulation in a limb or the viscera or the restoration of blood flow to as nearly normal as possible through vein grafting in an artery or use of a synthetic prosthesis. Such procedures require very exacting conditions.

The main complication, following such surgery, is new thrombotic formation in the grafted vessel or the one from which obstruction has been removed. The symptoms are those of acute arterial obliteration. The nurse must observe the colour and check the temperature of the affected extremity; arterial pulsation must be noted, in the wrist for upper extremity surgery, in the foot for lower extremity intervention. If the abdominal aorta is the vessel involved, check both lower limbs. Arterial blood pressure must be checked frequently. A drop in blood pressure means a slowdown in circulation, with increased danger of coagulation.

Amputation

When all other measures fail, amputation may become a necessity. After removal of toes or of a foot, the patient must not put his leg in a dependent position until the doctor gives permission. Following an above-knee amputation, stump movements are not only permitted but are necessary, beginning the evening of operation or the next day. The stump is sometimes elevated on a small pillow in order to stimulate return circulation, and

assist in preventing phlebitis—a possible complication whenever venous circulation is impaired.

The most practical dressing is one that swathes the whole stump. Ordinarily, a sterile towel is folded up over the area and held in place with a broad band of adhesive. To avoid stump oedema the band must not be tightened in the groin area.

Miscellaneous

After operations in the cervical area such as sympathectomy, first rib resection, surgery on blood vessels, thymus, parathyroid and thyroid glands, the surgeon frequently orders that the head of the bed be lowered below the level of the feet for 24-48 hours. A *small* pillow may be placed beneath the head. This position facilitates bronchial drainage. Secretions drain towards the mouth and can be expectorated with little effort. The nurse must not give in to the patient's pleas to raise the head of the bed, nor add an extra pillow. The patient's comfort may be affected for a few hours but his well-being, and the peace of mind of the surgeon is assured.

VEINS AND LYMPHATICS

Any obstruction to the return flow of blood to the heart may lead to venous abnormalities: varicosities; phlebitis, which in turn may lead to thrombus formation and the development of phlebothrombosis with subsequent danger of pulmonary embolism; thrombophlebitis and sequelae such as oedema, sclerosis, induration and ulcer; oedema. Some forms of leg oedema—often confined to one leg only—can be of lymphatic origin. Lymph bathes the tissues and has a role to play in the exchanges that occur between the tissue cells and the circulating blood volume. The total amount of blood and lymph is limited and must be in continuous circulation for proper body function. Various conditions may affect the lymphatic circulation. Once again, signs appear in the extremities. The nurse must know how to distinguish between conditions of venous and arterial origin.

Diagnosis

This is based upon clinical examination. It may be necessary to resort to radiographic techniques in order to arrive at a specific diagnosis. Contrast medium is injected through a cutdown into the back of the foot or the ankle. It is carried by the return circulation towards the heart. Preparation of the patient requires only general cleanliness and local skin disinfection. Following the procedure, the puncture site must be inspected for bleeding and the affected limb checked for oedema, diminished sensation or loss of feeling (especially when a hand is involved). The sutures of the venous cutdown are removed by the seventh day. In the presence of oedema, the incision may reopen because of fluid pressure in the tissues. The wound must be dressed so that the edges are in firm apposition, no matter how small the incision may be.

General Care

Apart from individual differences and possible climatic factors, impaired circulation is still the prime cause of venous thrombosis. The dependent position of the leg, while the individual is sitting or standing, is largely responsible for slowed venous circulation.

It is important to maintain as normal a circulatory rate as possible in patients who have venous abnormalities to prevent phlebitis. The foot of the patient's bed should be elevated two or three notches (about six inches). If he is confined to bed, he must exercise his legs frequently, putting toes, ankles and knees through a definite range of motion. When permitted out of bed, he must walk about, never stand in one spot.

To prevent venous stasis, the patient should have wide, elasticized bandages applied to his legs. Usually two rolls of bandage, four inches wide, are required. Later, when treatment has been instituted and the patient is convalescing, elastic stockings may be prescribed.

To be of use to the patient, the bandages must be applied correctly. Their purpose is to assist the return flow of blood to the heart by compression of muscles and veins. Bandaging should start at the toes,

usually with three turns around the foot, three figure-of-eight turns at the ankle, with the second bandage continued up the leg, turns crossed. The bandage turns are overlapped to provide firm support (not for aesthetic effects) and to avoid uncomfortable folds of material. There should be firm compression of the foot, decreasing pressure at the ankle and the calf of the leg. Undue compression of the ankle and the lower part of the leg will slow venous circulation and may result in oedema of the foot and toes.

The aim of this plan of general care is to stimulate return flow of venous blood to the heart; prevent slowing of the circulatory flow and venous stasis and thus prevent phlebitis and phlebothrombosis in the calf of the leg, with the probability of pulmonary embolism and its frequently fatal results.

There are certain small clinical signs which can aid in early detection of phlebothrombosis in the calf of the leg: unusual pain or sometimes simple discomfort of which the patient complains spontaneously or which may be induced by pressure or by dorsiflexion of the foot while the knee is extended. This pain is particularly significant if it occurs in *one* leg only. The nurse should check unobtrusively for these signs in *all* post-operative patients, especially after abdominal surgery; in patients who have suffered injuries of various kinds; who have cardiac disease, or who are bedridden. Patients with cardiovascular surgery rarely exhibit post-operative phlebitis.

If pressure on the calf of the leg or dorsiflexion of the foot (Payr-Homan's sign) induces sensitiveness or unusual pain, there is every reason to suspect the presence of phlebothrombosis. The doctor should be notified so that a definite diagnosis can be established and treatment, sometimes of a preventive nature only, instituted as soon as possible. From time to time a nurse detects post-operative phlebothrombosis even before the patient complains of it. If every nurse were on the alert, this could happen with greater frequency.

Treatment

The use of anticoagulants in

copied with venous thrombosis requires the same precautions as when prescribed for arterial conditions.

Compression Dressings for Ulcers

Obstruction of the normal return of venous blood to the heart means that the blood remains for a longer period in the veins. This may dilate forming varicosities; plasma and lymph exude into the fatty tissue causing oedema. Induration of tissue in the lower part of the leg results. Hemosiderin, an iron-containing pigment in red blood cells, is deposited in the skin producing a brown pigmentation. The slightest injury, such as a blow from a hard object, an insect bite or especially a scratch may result in a wound that is hard to heal and has a tendency to reopen once healing does take place. This is a varicose or post-phlebitic ulcer.

To ensure rapid, sure healing of these ulcers, which so often occur in difficult sites such as behind or below the ankle or sometimes on the front of the tibia, the causes—venous stasis and the itching that accompanies it—must be relieved or eliminated. Compression dressings will help in the formation of healthy granulation tissue.

The value of the compression dressing lies in the *application of local pressure* not in the medication used. Compression encourages quick, even granulation. The gauze must be cut to the size of the ulcer to apply pressure to the base of the wound. Sometimes vaseline tulle, with or without antibiotic in ointment or liquid form, is used. If the antibiotic is in liquid form, it should be remembered that this is not a wet dressing. Use only enough solution to moisten it slightly. Ordinary gauze squares are applied over the first layer so that they cover and extend beyond the borders of the ulcer. Asepsis must be preserved but the dressing should not be too thick. Shredded lint or several thicknesses of gauze cut to the size and shape of the ulcer are put in place as a final step. An elastic bandage is used to hold all in place. Be sure that the dressing is firmly in position before bandaging. Apply the bandage from the toes up; support the patient's leg comfortably for

the procedure. With practice considerable dexterity is achieved in application of compression dressings. A good dressing is not a thing of beauty but it is comfortable. If the patient has more than one ulcer, each one must be dressed separately.

The appearance of the granulation tissue at the base of the ulcer when the dressing is done again will indicate whether or not compression is being properly applied. The wound becomes clear very quickly; it develops a rosy tint which later becomes red. The imprint of the gauze can be seen on an even layer of granulation tissue. Slight bleeding when the dressing is removed is indicative of a healthy wound—a good blood supply and therefore good nutrition.

Compression dressings are not particularly complicated to apply. Patients are frequently taught to do them and manage very well. In hospital, rigorous aseptic technique must be observed. Wearing sterile gloves is not necessarily the whole answer. Thorough hand-scrubbing with soap and water can be equally effective. A mask is not required for every dressing but the nurse must avoid talking, etc. over an open wound or an exposed dressing.

Surgical Techniques

In general these comprise treatment of varicosities, post-phlebitic conditions, vein ligation, etc.

Following venous surgery, the patient must exercise his legs as soon as possible and as frequently as possible, even if there is pain. Ankles, knees and toes should be put through a range of motion. The nurse must be firm in seeing that this is done and must provide assistance as necessary.

The patient's fear that sutures will not hold must be relieved. It should be emphasised that the more he moves about in this early stage, the more quickly the pain will disappear, the easier it will be to move and the less likely will be the danger of phlebitis.

Following such operations, the foot of the bed, not the knee gatch, must be raised to two or three notches and the patient must not be permitted to dangle his legs over

the side of the bed until the doctor gives permission. When he is finally allowed up—the time depends on the type of surgery—the patient must walk about, not stand or sit, returning to bed when he is tired. There is no restriction on the amount of walking but obviously his legs must be supported with elastic bandages. When grafting is required, the patient is not allowed out of bed beforehand nor afterwards for 10-12 days.

CONCLUSION

In 1859, Florence Nightingale commented in her *Notes on Nursing* that the most important practical lesson that nurses can be taught is *what* to observe and *how* to observe; which symptoms indicate

improvement, which deterioration; which are the most important details, which are of lesser significance.

Particularly in the last decade, nursing has followed a pattern of development parallel to that of medicine but Miss Nightingale's dictum concerning observations is just as pertinent today in relation to cardiovascular surgery where nothing can be left to chance.

In this speciality where every movement must be justified, where practical application of theoretical data can easily give rise to confusion, observation must be founded on exact knowledge. Many times, the alert, responsible nurse, concerned with her role as an intelligent collaborator with the doctor,

will be in a position to verify how important it is for the doctor to be able to depend on her information or actions. The doctor and the patient have the right to rely upon the nurse's competence. Intelligent co-operation and efficiency are dependent upon a preliminary condition—knowledge in order to act.

(Concluded)

BIBLIOGRAPHY

Cartier, G.E., Cartier, P. and Stanley, P. "Indications chirurgicales dans les maladies circulatoires," *L'union medicale du Canada*, -87: 1294, 1958; 88: 374, 1959.

Chartrand, C. and Stanley, P. "La circulation extra-corporelle et la chirurgie cardiaque," *L'union medicale du Canada*, 90: 1245, 1961.

Nightingale, F. *Notes on Nursing* Montreal: J.B. Lippincott Co.

ANNOUNCEMENT

The League of Red Cross Societies, Geneva, are going to bring out two series of colour slides (size 6 cms. x 6 cms.—carton framed) illustrating:

- (a) The Life of Florence Nightingale—30 slides.
- (b) History of Nursing, in four parts of 25 slides each—
 - Part 1—"Primitive and Ancient Medicine".
 - Part 2—"Christian and Mediaeval".
 - Part 3—"Mediaeval (Physicians—Hospitals)".
 - Part 4—"Renaissance—17th, 18th and 19th centuries".

The above slides are intended primarily as visual aids in teaching history of nursing in schools of nursing both basic and post-basic and also to the general public. Both series are accompanied by a written commentary and will be available for distribution within the next few months. The approximate price will be Sw. Frs. 25 for series (a) and Sw. Frs. 60 for series (b) Or Sw. Frs. 18 for each part of (b), depending on the quantity of orders received.

Institutions and members interested to place an order for the slides are requested to write for their requirements direct to the DIRECTOR, NURSING BUREAU, LEAGUE OF RED CROSS SOCIETIES, PETIT SACONNEX, GENEVA, SWITZERLAND.

General Secretary TNAI.

NOTICE

Attention—Members of Andhra Pradesh Branch

May I take this opportunity to thank you for electing me as Chairman of the Public Health Section of the Branch. I may not be known to all of you, but many of you are known to me either through correspondence or personal contact. However, I hope I may be assured of your fullest co-operation in all my endeavour to organise this section for the benefit of members working in the public health field. The following categories of members are eligible for membership in the Section:

1. Public Health Nurses.
2. Auxiliary-Nurse Midwives who function in the Public Health field.
3. Public Health Oriented Registered Nurses.
4. Members of the Health Visitors League and Midwives and Auxiliary-Nurse Midwives Association.

Membership in the Section is free.

I would be glad to give any further information on request.

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