

## HAEMORRHAGE AND ITS FIRST-AID TREATMENT

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Haemorrhage, or bleeding, may be defined as the escape of blood from the closed circuit formed by the heart and the vessels in which the blood normally flows. It may be caused by injury or disease, and its severity depends upon the part of the circulation which is injured. It may be external or internal.

The characteristics of the three main types of external haemorrhage are:

(1) *Arterial haemorrhage*. This is the most severe type in that the flow is rapid and profuse. It comes mainly from the proximal side of the wound in a forcible, pulsating stream, bright red in colour.

(2) *Venous haemorrhage*. This flows from the cut end of the vessel distal from the heart in a steady, low-pressure stream, the rapidity depending upon the size and position of the cut vein. In the neck or when the veins are varicose the flow may be from both ends of the vessel. The blood is dark in colour.

(3) *Capillary haemorrhage*. The bleeding takes the form of a steady oozing from the whole surface of the wound. It is much less extensive than from veins or arteries. The colour is midway between that of arterial and venous blood.

Treat the bleeding by (a) indirect pressure on the course of the artery above the wound, first by digital pressure, and then, as this cannot be maintained for long by one person, by applying a tourniquet if the bleeding is from a limb; or (b) direct pressure, by exposing the wound adequately and applying pressure directly on to the bleeding point. If there is no fracture present, a pad and firm bandage may be sufficient to maintain the pressure. If there is a fracture the haemorrhage must be controlled by indirect pressure from above and a light dressing placed over the wound.

The flow may also be reduced by general measures, e.g., the patient must lie down and be encouraged to keep quiet. This lessens the force of the heart beat. The actual bleeding point should be elevated above the level of the heart if this is at all possible. Stimulants should never be given until the bleeding point is efficiently secured. Keep the patient warm by means of warm blankets and hot water bottles, but avoid overheating as sweating will increase the fluid lost by the body.

In applying digital pressure it is important to remember that the artery must be compressed against a bone, using sufficient force to stop the bleeding. The ball of the thumb should be used because this gives a stronger and steadier pressure than is possible by using the fingers. Care should be taken to compress the artery only, avoiding veins, nerves and other structures in the vicinity. The advantages of digital pressure are that it can be applied immediately and the wound is not touched by the operator's hand. The drawbacks to its use lie in the fact that it can be applied

to certain parts of the body only and it cannot be maintained by one person for more than 10 to 15 minutes at a time, so that some form of tourniquet is often very useful.

Having instructed an assistant to compress the artery, obtain a bandage, scarf, handkerchief, belt, piece of rope or any other suitable article, a stick, and a firm pad to place over the artery. A tourniquet should not be applied to bare skin. If a garment cannot be left on, a second handkerchief or a bandage must be put under the tourniquet, or a folded handkerchief under the knot. Put the firm pad in the fold of the bandage, place it accurately over the pressure point of the artery, get the assistant to hold it in position, pass the bandage around the limb, tie once, put the stick over the half knot, and then tie a reef knot over the stick. Tighten the tourniquet by rotating the stick until the bleeding stops or the pulse below the artery is obliterated, and then apply another bandage around the limb to fix the stick in position.

Such a tourniquet must not be left on for more than half an hour as it is compressing all the blood vessels in the limb. If medical aid has not been obtained, the tourniquet should be loosened for a few minutes while an assistant maintains control of the haemorrhage by digital pressure. This allows of sufficient circulation through the limb from auxiliary vessels to avoid the possibility of gangrene. The St. John Ambulance tourniquet consists of a strap with a wooden pad. It is fastened by a buckle and it has a special twister. Its great advantage over an improvised tourniquet is that it gives localised pressure over the artery without compressing other structures in the limb.

The following are the main points of pressure which can be used in the control of ARTERIAL HAEMORRHAGE:

(1) *The common carotid artery.* For haemorrhage from high neck wounds this artery can be controlled one and a half inches above the sternoclavicular joint by compressing it against the transverse process of the sixth cervical vertebra. Stand facing the patient, place the thumb in position, and press backward and inward until the bleeding stops, or, in practice work, until the temporal pulse is obliterated. Be careful to avoid pressure on the jugular vein or the vagus nerve, both of which run very close to the artery. It may be necessary to get an assistant to compress the artery above the injury, for, owing to anastomoses, there is a cross-circulation in the head. Relays of helpers will be required, unless the surgeon arrives speedily, for one person cannot maintain adequate pressure on this artery for more than five minutes at a time. The second person should place his thumb over that of the first person, who slips his out from underneath.

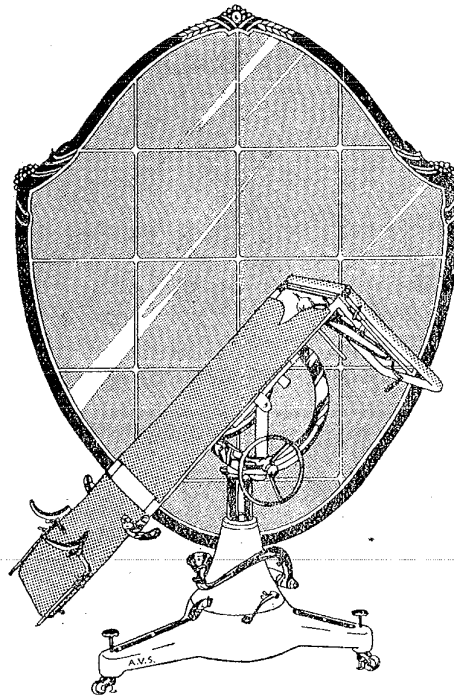
(2) *The facial artery.* This runs over the mandible at a point about two fingers breadth from the angle of the jaw. Compression at this point does not always control haemorrhage owing to the wide and free anastomoses of arteries. For haemorrhage from a cheek wound it may be necessary to put one finger inside the mouth and compress the bleeding vessel between the finger and

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thumb. For the lingual artery, wrap a handkerchief round the thumb and the first finger (to prevent slipping), and, inserting them into the mouth, compress the artery between them.

(3) *The temporal artery.* This can be felt pulsating in front of the ear, passing over the zygomatic process. It can be compressed there.

(4) *The occipital artery.* This passes behind the mastoid process and can be compressed at a spot four fingers breadth from behind the ear. For haemorrhage from the scalp the usual method is to place a pad over the bleeding point and secure it with a bandage if there is no evidence of fracture. If a fracture is suspected, make a ring pad by taking a diagonally folded handkerchief or a small triangular bandage folded narrow, passing one end of it round the fingers and then passing the other end of it through and through the loop thus made.

(5) *The subclavian artery.* This passes across the upper surface of the first rib, against which it can be compressed. Ask the patient to drop his shoulder and draw it forward, inclining the head towards the injured side. Press downward and backward with one thumb and control the pressure with the other. Relays of helpers will be necessary to maintain this control.

(6) *The axillary artery.* It is difficult to control this by digital pressure, but forced flexion may be used. Place a large pad high up in the axilla, fix by a bandage tied in a halfknot at the top of the shoulder, carry the ends over the chest and the back respectively, and fasten them at the opposite axilla. The flexed arm is then fixed to the side by a broad bandage, the hand lying under the first bandage as it crosses the chest.

(7) *The brachial artery.* This passes along the inner border of the biceps muscle and can be compressed against the shaft of the humerus. Extend the arm, holding the patient's hand from behind, then pass the fingers of the other hand under the arm, place them over the artery, and press the artery against the bone. (This is an exception to the use of the ball of the thumb.)

(8) *The radial and ulnar arteries.* These pass near the outer and inner borders of the flexor aspect of the wrist. Both need to be compressed, even if only one is cut, because they anastomose in the palmar arch. Compress with the two thumbs; or tie two knots in a bandage, to come over the arteries, and secure it firmly round the wrist. For haemorrhage in the palm of the hand it may not be necessary to compress these arteries. A firm pad is grasped by the patient and the hand is bandaged with the finger flexed. For a bleeding finger place a pad over the bleeding point and secure it by strapping or by a firm bandage.

(9) *The femoral artery.* Passing over the superior ramus of the pubes this artery runs through the centre of the groin and then follows a line drawn from the anterior iliac spine to the internal epicondyle for the femur, for about two thirds of its length; but from there it passes behind the knee as the popliteal artery. To compress the upper part of this artery, sit facing the patient, locate the point in the groin, and, with both thumbs,

compress downwards against the brim of the pelvis. For haemorrhage from the lower third, compress, or apply a tourniquet, at the appropriate point on the line of the artery. Haemorrhage from the popliteal artery must be controlled by compression of the femoral, and so also must bleeding from the upper parts of the anterior and posterior tibial arteries, for they lie deeply in the calf muscles.

(10) *The dorsalis pedis.* This is the lower part of the anterior tibial artery. It runs down the front of the foot and it can be compressed at a point midway between the two malleoli.

(11) *The posterior tibial artery.* The lower part of this passes behind the internal malleolus, against which it can be compressed.

Direct pressure will always control VENOUS HAEMORRHAGE, and then a pad and bandage can be applied over the bleeding point; if from a large vein some special treatment may be required. Place the patient in a recumbent position and elevate the bleeding point if in a limb, because although this will momentarily increase the haemorrhage seeing that the blood is flowing towards the heart, it will decrease the arterial inflow which keeps up the supply of venous blood. If a wound has to be treated remove all proximal constrictions, such as garters, and apply a tight bandage on the distal side. The wound can then be exposed without risk of further venous haemorrhage.

If a vein is varicose it will bleed from both sides of the wound. Firm bandages should then be applied both above and below the bleeding point; but be very careful not to obstruct the arterial flow.

CAPILLARY HAEMORRHAGE. Usually a simple compress supplemented by applications of hot or cold water will be found sufficient to control capillary haemorrhage, unless the patient suffers from a blood disease, such as haemophilia, or is jaundiced. Styptics may be used when the capillary oozing is troublesome, examples being perchloride of iron and adrenaline.

INTERNAL HAEMORRHAGE may follow rupture of an organ such as the liver, spleen or kidney; from injuries such as punctured wounds, severe crushes, or falls from a height; or it may be due to the rupture of an abdominal vessel as a result of disease—as occurs in typhoid fever. In women, the commonest cause of severe internal haemorrhage is a ruptured ectopic gestation which involves the ovarian artery.

*Signs and symptoms.* If haemorrhage occurs into any body cavity or hollow viscera the general signs and symptoms are similar to those of shock, although there may be no pain to account for it, and the rapidity with which the condition develops is very great. The blood remaining in the circulation is diverted to the more vital structures, such as the brain, therefore the skin vessels are constricted and the patient is cold, pale and clammy. His pulse is rapid and feeble and his respirations are sighing. The patient complains of faintness, indistinct vision and extreme thirst.

*Treatment.* Send immediately for the doctor. The only first-aid treatment is to keep the patient as quiet as possible, placing

the head low unless the bleeding is into the lungs. If it is thought to be into the stomach give nothing by mouth; otherwise the patient may have water if he wishes. No stimulants of any kind may be given. Keep the patient warm, but avoid overheating as this will cause loss of fluid by sweating.

*Haemoptysis.* The blood is red and frothy and is coughed up. It may be only a few ounces, or a pint or more may be lost. There is seldom danger to life from loss of blood except in a few cases of very advanced pulmonary tuberculosis or ruptured aneurism, which are rapidly fatal and not amenable to treatment. It is therefore most important to ensure that the blood is coughed up profusely, as aspiration of the blood into the healthy lung is the main danger to be feared.

*Treatment.* Try to allay the patient's anxiety and place him in a sitting position. Give him plenty of fresh air and exclude fussy friends. If he wishes he may be given ice to suck or cold water to drink. Sedatives may be ordered—but not morphia, because this inhibits the coughing reflex and so hinders the patient from clearing his lungs efficiently.

*Haematemesis.* Vomited blood may be coming from bleeding vessels in the stomach or duodenum, but it may have been previously swallowed and have originated from a tooth socket, a tonsil bed, or from the nasal cavities. It is usually dark in colour and, if partially digested, it has the appearance of coffee grounds. The best emergency treatment is absolute rest in the recumbent position, keeping the patient as quiet as possible. Give nothing by mouth until the arrival of the doctor. Keep the patient warm without overheating.

*Epistaxis.* The patient must sit up with his head thrown slightly back—not held over a basin. The collar or other constriction around the neck must be loosened and the patient should be instructed to breathe through his mouth and to avoid blowing the nose. Cold applications can be placed over the bridge of the nose. If the bleeding continues it may be necessary to plug the posterior nares, using narrow gauze soaked in adrenaline.

*Bleeding from a tooth socket.* This usually stops of its own accord, but if it persists the tooth socket can be plugged with sterile cotton wool protruding a little above the level of the teeth and the patient instructed to close the jaws upon it, or he can be asked to bite upon a roll of narrow gauze.

*Haematuria.* This may be due to injury to the kidney, bladder or urethra, or to spontaneous haemorrhage from the kidney. No first-aid treatment is possible except that the patient should be put to bed and kept quiet and warm until the arrival of the doctor.

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