

sequent irritability of the nervous system is to be treated with opiates.

When the loss of blood is so great that reaction is impossible through the ordinary methods, resort must be had to transfusion. This operation consists in abstracting blood from a robust man or woman, and injecting it into the veins of the exsanguinated patient. If an apparatus for the purpose is not at hand, or its use but little understood, a common hard-rubber syringe, with a capacity of five or six ounces, will answer. An opening is made in one of the veins of the forearm, and into this a canula, adapted to the point of the syringe, is inserted. A bandage tied below the incision prevents further bleeding. The syringe, warmed and charged with the fresh blood, is introduced, and the piston steadily forced down until the instrument is emptied. From ten to twenty ounces may be injected at one sitting, and the operation may be repeated if necessary. Care must be taken to force out all air from the syringe before it is used. The efficacy of this operation has been fully proved. Patients have been restored to life under circumstances which were such as to almost preclude the hope of recovery.

I have lately employed a modification of Dieulafoy's aspirator in transfusion. The arm is bandaged as in the ordinary method for venesection, and a needle of the aspirator inserted into the distended median basilic vein. The stop-cock of the aspirator is then turned, and the blood rushes in and fills up the cylinder. A vein in the patient's arm having been exposed, and an opening made in it for the insertion of a canula, the tube from the opposite side of the aspirator is attached, and the blood forced through it into the vein. See APPENDIX.

CHAPTER II.

HÆMORRHAGE—(CONTINUED).

Bleeding from the Nose, Mouth, Lungs, Stomach, Intestines, Kidneys, Ureters, Bladder, Urethra.—Echymosis.

EPISTAXIS, or bleeding from the nasal passages, is the most frequent and least dangerous of all internal hæmorrhages. It occurs generally from one nostril. Repeated hæmorrhage from the left nostril is said to be a certain indication of splenic disease.

Some of the capillary vessels of the nasal mucous membrane communicate directly with those of the cranial cavity, and, when epistaxis appears during congestion of the brain, its action is decidedly beneficial in diminishing the quantity of blood in that organ. In inflammations of the mucous membrane, a rupture of the distended and engorged capillaries may be the commencement of a healthy action. All cases of epistaxis, however, are not attended with the same good results: the bleeding may be so persistent as to seriously endanger life.

The ancients considered bleeding from the nose as an indication of fever, and bled and purged the unfortunate patient while any trace of the disorder remained. The blood was supposed to be overheated, and in a state of ebullition, which rendered its removal necessary.

The causes of epistaxis are violent exercise after drinking, laceration of vessels by blows or falls, cardiac disease, catarrhal inflammations, congestion of the brain, syphilitic or scrofulous ulceration, the hæmorrhagic diathesis and disordered conditions of the blood, such as occur in scorbutis, purpura, and continued fevers.

Severe forms of epistaxis are preceded by a feeling of weight, and fulness about the forehead, with pain and vertigo.

Treatment.—First ascertain whether the blood escapes from both nostrils, or from the right or left; then, on the affected side, raise the arm above the head, and grasp the nose with a firm pressure between the thumb and forefinger; at the same time, a towel saturated with ice-water may be laid on the forehead. The arm is raised to *distribute* the force of the heart's action, and to take the pressure off the carotid vessels, diminishing the strength of the current through them.

Some advise the application of ice to the mammæ of the female and testes in the male, or simply placing the hands in cold water. When pressure, raising the arm, or cold applications, are unsuccessful, styptics may be resorted to. Inject with a syringe a quantity of ice-water, or a solution of common salt, in the proportion of one tablespoonful to half a tumber of water; or some of the preparations of iron, such as solutions of the pernitrate or persulphate. The iron may be thrown up the nostril, either diluted or not, or a piece of lint, twisted and moistened with the solution, may be forced up the canal and allowed to remain until the bleeding ceases. When the blood comes from laceration of the naso-palatine artery, all these measures are apt to fail,

and the posterior nares must then be plugged. The operation of plugging is simple, and does not require a great amount of skill. It may be performed with Beloc's canula or a gum-elastic catheter (No. 4 or 5 will do). Through the eye of the instrument pass a string, allowing the ends to hang down.

Introduce the catheter through the nostril into the mouth, and draw the string, which is hanging from its end, out beyond the lips. To this attach a piece of sponge sufficiently large to fill up the opening in the posterior nares. Then withdraw the catheter from the nose, and make traction on the string until the sponge is drawn back into the posterior nares, completely filling its cavity. If necessary, the sponge may be dipped in an astringent solution before its introduction. This method scarcely ever fails to control the most obstinate hæmorrhage.

STOMATORRHAGIA.—Hæmorrhage from the mouth. This variety needs scarcely more than a passing notice. It requires special treatment only when occurring in persons with the hæmorrhagic diathesis. Inflammation of the buccal cavity, ulcers, and injuries, are its principal causes. Rinsing the mouth with alum-water, or some other astringent preparation, will check it effectually.

HÆMATEMESIS.—Hæmorrhage from the stomach generally occurs during the progress of some chronic disease of the liver, portal system, or stomach. Any obstruction to the return of blood through the portal vein, such as exists in the dram-drinker's liver (*cirrhosis*), in inflammation or thrombosis of the vein, will occasion it. Chronic ulcer and cancer of the stomach, gastritis, and corrosive poisons, are also prolific causes.

In cirrhosis, the liver is diminished in size by the contraction of new *fibrous* tissue, which is formed throughout the organ during the inflammatory process. This new tissue is either developed from inflammatory lymph (*Rokitansky*), or by the proliferation of connective-tissue cells (*Virchow*). It is located principally around the hepatic vessels. By its contraction, the ramifications of the portal vein are pressed upon, and their capacity diminished or destroyed, and the result is a damming back of the blood in the stomach and intestines. In a short time the distention is greater than the walls of the vessels can resist, and consequently they are ruptured. Coagulation of blood in the veins (thrombosis), with or without inflammation, produces hæmatemesis in a similar way.

In chronic ulcer and cancer, molecular death of the tissue proceeds gradually, until the capillary walls are reached and perforated. If a large vessel have been opened, the bleeding may cause death in a short period; but such an event rarely happens.

Instances are recorded of hæmorrhage from the stomach occurring at the menstrual period. In this vicarious menstruation, the usual flow from the uterus is absent.

In profuse hæmorrhage from the stomach, the patient will have a feeling of fulness and oppression in the epigastrium. The countenance becomes pallid; there are vertigo and dimness of vision; and finally a fluid, which imparts a warm sensation to the œsophagus, is vomited. If the blood have been extravasated suddenly and in an empty stomach, there will be little change in its physical or chemical characteristics. But if slowly exuded, and allowed to mingle with the gastric juice, or partially-digested food, it takes on a dark

color resembling "coffee-grounds." The normal alkaline reaction is changed to acid, and the blood will not coagulate. These peculiarities are usually present, and in cirrhosis they are particularly marked. Blood from wounds of the mouth is sometimes swallowed and afterward thrown up, but a careful examination will reveal the source, and prevent an erroneous diagnosis.

The act of vomiting, which forces out the blood in hæmatemesis, is seldom attended with nausea. In passing out some may enter the larynx and induce a fit of coughing, thereby leading to the supposition that the blood is from the lungs, instead of the stomach. On the other hand, a paroxysm of coughing, with hæmorrhage from the lungs, may bring on nausea and vomiting, and cause the physician to locate the disorder in the stomach. It is necessary, therefore, in making a diagnosis, to exercise care and judgment.

It is well to remember that blood from the stomach is generally dark in color, mixed with food, and is acid in reaction. If coagula are present, they will be found black and heavy, from absence of air. There will be a previous history of pain, nausea, vomiting, and a disordered stomach, with the special symptoms of the disease which may have occasioned the hæmatemesis.

In hæmorrhage from the lungs, the blood is generally bright red, frothy, mixed with bubbles of air, and alkaline in reaction. A fit of coughing precedes and accompanies the bleeding. There are pain in the chest, and signs of tuberculosis or other affection of the lungs or cardiac disease, and there is no history of disease of the liver or stomach. Moist râles can be heard on auscultation, near the seat of the pain, and there may also be slight dulness on percussion.

In all doubtful cases, the mouth and fauces should undergo a careful examination. Hæmorrhage from these parts is often mistaken for hæmatemesis. A perfect knowledge of these points of difference, and their careful investigation at the bedside, will make the diagnosis a matter of almost positive certainty.

Treatment.—Absolute rest in the recumbent posture must be rigidly enforced in this and every other variety of internal hæmorrhage. The patient's room must be kept free from visitors, and only the nurse and doctor are to be admitted. Every source of excitement must be removed. These stringent preliminaries are, of course, only required when much blood has been lost. There are many mild cases in which they are not called for. Ice stands at the head of all remedial agents for the suppression of hæmatemesis. It can be administered continuously in small pieces, or at different intervals, as the case may demand. Cloths wet with ice-water, or pounded ice in bags, may also be applied over the epigastrium. Ether-spray, directed over the stomach, produces intense cold, and is worthy of trial. Of the various styptics employed, some prefer the following :

℞. Liquor. ferri-sulphatis ʒi.
Aquæ ʒii. M.

One teaspoonful of this solution is to be given every half hour, or more frequently if required. Other preparations of iron are also used. Some prefer the acetate of lead in one or two grain doses. Alum, creosote, tannic and gallic acids, answer in some cases.

All the solutions employed should be kept on ice, and given in small quantities, as they are apt to be thrown up.

If vomiting is produced by one preparation, let something else be substituted. The contractions of the stomach in the act of vomiting increase hæmorrhage.

The subsequent treatment must depend entirely on the accompanying disease and the amount of blood lost. Nutritious diet and tonics are indicated to restore the lost vitality. When strength is regained, the disease which produced the hæmorrhage should receive special attention. If the bleeding has been so great as to induce collapse, rapid stimulation should be resorted to in the manner described in the preceding chapter.

Melæna is a term usually employed to denote hæmorrhage from the bowels, although any dark-colored discharge from the same parts might properly be classed under the same head. *Melæna* is caused by many of the same disorders which occasion hæmatemesis. The portal venous system, which carries blood from the stomach, also takes it from the intestines. Any abnormal condition, therefore, which obstructs the circulation through the portal vein, such as those previously mentioned, is liable to produce extravasation of blood in any part of the stomach or intestinal canal. Sometimes the blood which is poured out in the stomach passes through the pyloric orifice, and is voided by the bowels instead of being vomited.

Among other causes of bleeding from the intestines may be enumerated ulceration of the mucous coat, from chronic or acute inflammations, and rupture of capillary vessels during inflammatory congestion, as in dysentery and enteritis. *Hæmorrhoids*, or piles, are also classed as common causes. In low forms of fever, such as typhoid or yellow fever, hæmorrhage from the bowels is not of infrequent occurrence. In

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the first instance, it is due to ulceration; in the second, it arises from rupture of blood-vessels.

When the blood proceeds from the upper part of the intestinal canal, or when it is poured out in small quantities, it appears in dark masses resembling tar. In profuse hæmorrhage it has the same characteristics as when occurring from other organs. When the bleeding is due to ulceration, the blood is generally redder than in rupture of portal capillaries or in piles. Hæmorrhage from intestinal hæmorrhoids (piles) occurs more frequently than any other variety. In cirrhosis of the liver, the gastric vessels are, as a rule, first ruptured, and afterward the vessels farther down the canal. Occasionally, cases of violent hæmorrhage from the bowels, due to cirrhosis, prove fatal in a few moments. Plethoric persons, who feed on the fat of the land, and indulge freely in wine, are at times subject to small hæmorrhages while straining at stool. The portal venous system contains a much larger proportion of fluid during digestion than at any other period, and in plethoric men this distention reaches its maximum, so that, in a violent effort to evacuate the bowels, some of the engorged capillaries rupture and relieve themselves. This variety of melæna occurs independent of any organic disease, not even hæmorrhoids being present to account for it. Hæmorrhage of this character acts as a safety-valve, and should be let alone unless too profuse.

Treatment.—The general rules which govern the treatment of other varieties of hæmorrhage must be followed here; perfect rest and quiet secured, and every excitement avoided. Cold water poured slowly from a sprinkler or pitcher is advisable in alarming cases. Cloths wet with ice-

water, or injections of ice-water, or of pounded ice, into the rectum, are beneficial. The vegetable astringents, such as logwood, oak-bark, catechu, tannic and gallic acids, given by the mouth or rectum, act well in mild forms of hæmorrhage. Some prefer the styptic solutions of iron, mentioned in the treatment of hæmatemesis. Small doses of opium, to diminish peristaltic action of the intestines, should always be given. I have found tannic acid and opium, administered by the mouth, and the application of cold water to the abdominal walls, answer admirably in ordinary cases of melæna.

HÆMOPTYSIS.—The occurrence of hæmorrhage from the lungs was at one time considered a certain indication of tubercular deposit. It was a sign of fatal significance in the eyes of physician and patient. A closer investigation of pathological changes in the lung-tissue has demonstrated conclusively the erroneousness of this idea. Hæmoptysis is found, in the majority of cases, to depend on conditions which do not seriously endanger life, and which are amenable to treatment.

The class of persons most subject to this hæmorrhage are those who grow rapidly in height, without a corresponding development in bulk, who are pale and delicate, and subject to common colds and scrofulous inflammations. In these cases there is a general lax condition of the system, a want of tonicity in the capillary vessels, and in other tissues throughout the body, which predispose to hæmorrhage. In inflammation of the larynx, trachea, or bronchial tubes, the vessels of the mucous membrane are distended with blood. A paroxysm of coughing increases the internal pressure on these vessels to such an extent that they rupture, and blood

appears in the expectorated fluid. The amount of blood poured out will of course depend on the size and number of the ruptured capillaries. In all cases of catarrhal inflammations of the air-passages this rupture and extravasation are liable to occur, independently of other affections. If the blood were expectorated, the hæmorrhage would be rather a benefit than otherwise; but sometimes it remains in the smaller tubes and air-cells, acts as an irritant, sets up inflammation, and finally may go on to consolidation and subsequent softening and degeneration of the lung-tissue (*Niemeyer*).

Organic disease of the heart is accompanied by hæmoptysis. When insufficiency of the mitral valve exists, the blood regurgitates into the left auricle, which is therefore partially filled with blood that should have remained in the ventricle. This causes a damming back, or obstruction, to the blood coming from the four pulmonary veins to the auricle, and consequent congestion of the lungs. The capillary vessels in the bronchial tubes, and in other parts, are distended, and relieve themselves by rupture.

Sometimes, in these cases, large extravasations of blood occur in the parenchyma of the lung (*pulmonary apoplexy*), lacerating and destroying its substance, and hastening a fatal termination. Extravasations of blood in cardiac disease are also due to another cause, viz., the plugging of small arterial capillaries by clots of fibrine detached from the right side of the heart. These clots are carried into the pulmonary artery, blocking up some of its terminal branches. This obstruction necessarily diminishes the current in the capillaries supplied by the plugged vessel; they become crowded, choked up with blood, the internal pressure soon forces their thin walls to give way, and the blood is extrava-

sated into the air-cells, terminal bronchi, and between the elastic fibres of the cells. These clots, after coagulation, are circumscribed, sharply defined, and dark in color. To this old condition a new name has been given, viz., *hæmorrhagic infarction*, to distinguish it from another variety of pulmonary apoplexy in which the clot is diffused, and lung-tissue destroyed.

Tubercular deposit induces hæmoptysis in one of three ways: 1. By mechanical pressure it may obstruct the small attenuated vessels so as to cause rupture; 2. It may create inflammatory congestion, which is relieved by the walls giving way; or, 3. The softening and degeneration of tissue which accompany the second and third stages of tuberculosis, involve the capillaries, destroy them, and hæmorrhage is the result.

Gangrene of the lung is seldom accompanied by hæmoptysis. When present, it is due to the morbid process including the vessels in the general destruction.

The hæmoptysis which occasions the characteristic rust-colored sputa of pneumonia either arises from laceration of the minute capillaries, or by the passage of the red globules through the wall of the vessel without rupture. The latter process is doubtful, to say the least of it.

The inhalation of chlorine gas, sulphuretted hydrogen, and other irritating substances, likewise occasions hæmoptysis. Wounds of the lung are always attended by more or less expectoration of blood.

One curious and rare variety of hæmoptysis is that which occurs at the menstrual period, when the discharge of blood from the uterus is absent. There are but few cases on record. Dr. Watson relates one of a young girl who men-