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HEMORRHAGE IN RHINOLARYNGOLOGIC WORK.*

BY ARTHUR M. CORWIN, M. D.,

CHICAGO.

Leaving out of account the uterus, perhaps the nose is responsible for more spontaneous loss of blood than any other region of the body, and bears its full share of accidental and operative hemorrhage as well.

And when one recalls the prime value of the blood as water carrier, food conveyor, oxygen bearer, distributor of heat, scavenger of tissue waste, equalizer of metabolic balance through the influence of hormones widely collected and widely delivered; and when one remembers the important defensive function which the blood has through its antibodies, its opsonins and its phagocytes, the rhinolaryngologist assumes added responsibility as conservator and prophylactor against blood waste.

This brief paper does not aim to summarize all the data suggested by the title. Rather shall we speak of some types of hemorrhage, emphasizing some differences among individuals of the bleeder group with which we occasionally have to deal.

It is not uncommon for physicians, even laryngologists, to apply the word bleeder or hemophiliac in a loose way to describe the episode of vicious epistaxis, or severe, possibly fatal postoperative hemorrhage marked by prolonged bleeding time and delayed coagulation, but without adequate grounds for such a diagnosis. Hemophiliac applies to a distinct type. We have in mind several cases in which the term was misapplied; for example, a boy ten years old suffered from a low grade toxemia following a mild attack of tonsillitis, which apparently cleared up locally, but left him weak and progress-

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ively losing. When we saw him, after nearly four weeks in bed, he was having a severe persistent epistaxis which oozed considerably after posteroanterior packing. He was oozing from his gums, exhibited numerous small ecchymoses on his legs and back, and subconjunctival hemorrhage. There was tenderness over a palpable spleen, and enlarged cervical glands. The viscera otherwise apparently normal. Temperature irregular, not above 102° F., at the highest. Pulse, 100 to 110. Hemoglobin, seventy-five per cent; red cells, 4,000,000; leucocytes, 9,500, practically normal. Coagulation time was much increased, the blood remaining grumous and unclotted in the basin for nearly an hour.

The bleeding was stopped by repacking the nose with coagulose on gauze and by injection of pituitrin every six hours for three doses. On the second day he was given twenty cubic centimeters of blood serum from his brother. This, together with out-of-door treatment, arsenic and iron, was followed slowly but steadily by recovery, in spite of the fact that purpura in the course of infection is not a good sign, suggesting, as it does, fatty degeneration of the intima.

The boy had been subject to severe nose bleeds, and the family, aroused by leading questions on the part of the attending physician, had dug up a number of supposed hemorrhages among relatives. These, upon close questioning, did not prove reliable, and the possible supposition of hemorrhagic diathesis complicated by an infection dissolved into the diagnosis of purpura.

And we recognize that purpura, whether simple or hemorrhagic, is merely a symptom complex resulting from toxemia of a wide variety with no single pathologic foundation.

Rhinolaryngologic hemorrhage, purpuric in character, is an incidence in scurvy, phosphorus or snake venom poisoning, the grave cachexias, leukemia and anemia, and bacterial infections of many kinds. They do not come to nose and throat men, as a rule, except in the service of large hospitals. To differentiate these purpuric types of hemorrhage, heredity is wanting, except in rare instances; in most cases they are individual bleeders, not hemophiliacs; they frequently show various grades of blood change, and there is fatty degeneration of the capillary walls. But the blood frequently clots in normal time. In any

case, the diminished clotting is nothing like as marked as in hemophilia; the blood platelets are also apt to be diminished.

The hemorrhage of venous stasis is, fortunately, more interesting to us academically than practically, for it is rather rare. The nose bleeds, and other usually trivial bleedings, subcutaneous or otherwise, which are occasionally seen in pertussis, are of this character.

The varices at the base of the tongue are rarely the site of hemorrhage, and yet their rupture may give extreme anxiety to both patient and physician unless identified. To illustrate: we recall a woman of forty years, apparently well, though when she presented herself she was a trifle short of breath, cyanotic about the lips, and suffered from a cough, with spitting of blood, which had occurred off and on frequently for some weeks.

The patient's own diagnosis was, of course, tuberculosis, but though there was well marked broken cardiac compensation, with moderate edema of the feet and ankles, etc., in the course of an old mitral lesion, the hemorrhage was not from the lungs, as was supposed, but from a break in a large vein at the base of the tongue. The treatment was naturally not local, but proper rest and cardiac medication, which was promptly effective in checking the bleeding permanently. This type of hemorrhage from throat and nose has been reported in cases of alcoholic cirrhosis.

The following is an example of laryngeal hematoma which we saw in a man of forty-five years, who had suffered from a severe subacute tracheobronchitis with severe paroxysms of cough. He was free in his use of alcohol, showed evidence of hepatic cirrhosis, with the usual gastric disturbance. After an attack of coughing, he felt a fullness in the throat, which increased to a sensation of choking, and within a short time was followed by laryngeal stridor, dyspnea and great anxiety. The pulse was rapid, and the patient sitting upright in a cold sweat, evidently in a serious condition, suggesting edema of the glottis. The examination was difficult; with the light of the house lamp we finally made out a large bluish mass obscuring the glottis entirely, but a little more to the right than to the left. With a laryngeal speculum and a long straight

bistoury, wrapped with cotton except at its point, a short incision was made, followed by a burst of venous blood, giving prompt relief to dyspnea and voice. This hematoma was on the right side of the glottis, seemingly arising from the arytenoid. Incidentally it was not difficult to entirely reform the patient's alcoholic habits after that experience.

Returning to hemophilia proper, while we speak familiarly of this affection, it is not common in America, though it is said to occur twice as frequently in Germany as elsewhere. One of the very few cases the writer has ever seen was in the charity hospital at Berlin. It would be interesting to know how many cases—or rather how few—of real hemophilia have been seen by the members of the society. We venture to say they have been very few, counting the cases seen as hospital curiosities.

The speaker has seen but two cases, neither of them personal patients. In fact, we, as a profession, have not learned much more about the hemorrhagic diathesis than we were taught as students; that it is characterized by obstreperous, well-nigh uncontrollable bleeding, upon slight provocation; that it occurs spontaneously, subcutaneous and deep seated, or superficially from trivial wounds. Why it does not begin until after the second year of age, why it tends to wear out and disappear in adult years, if the patient lives long enough, is as much a puzzle as is the cause of this mysterious malady. While we were taught that it was the female who always transmitted the tendency or potentiality, and so made good Kipling's reference to her deadly reputation, we have more recently learned that she hands it invariably to a male and is herself unaffected; no female is a hemophiliac. This power of transmission through the unaffected female is also exemplified in color blindness, night blindness and diabetes insipidus, and as reported in ichthyosis and pseudomuscular atrophy. Though Virchow, and indeed earlier investigation, leads us to believe that there was in hemophilia some peculiar change in the vessel wall, a greater thinness and fragility, evidence has disproved this, or at least none has confirmed it. The three hundred and thirty-four patients collected by Grandidier revealed one hundred and sixty-nine (half of them) as

epistactic cases. But the value of this ratio is minimized by the fact that Grandidier believed that females as well as males were hemophilic in the ratio of one to four. His report contained forty-eight female bleeders, now known to be spurious in the light of the work of Bullock and Fildes, who proved that only males are actually affected. The bleeding of those forty-eight must have been due to some form of purpura or other acute condition. The real bleeder diagnosis is then summed up in:

1. Definite heredity, through unaffected females (law of Nasse).
2. Prolonged bleeding time.
3. Coagulability markedly diminished.
4. Normal blood picture except leucopenia, if anything. Blood platelets not diminished, as some have reported.
5. Origin in early youth.

We are nearly as much at sea why the hemophilic loves to bleed as we are why normal blood loves to clot.

In view of our simple conception of coagulation, twenty-five years ago, the up-to-date biochemist seems vastly learned until we come to find that his rich vocabulary is but a cloak of ignorance, like the words idiopathic and diathesis. The foremost hypothesis concerning blood clotting may be visualized by the following verbal dominoes set on end in a row: when the first falls against its neighbor, they all go down seriatim to the last, fibrin, clotted blood. To be specific, thrombokinase or kinase, not considered present in circulatory blood, but present in shed blood, is supposedly derived from disintegration of fixed or blood cells and platelets; this acts upon another hypothetical substance, prothrombin, which in the presence of calcium salts and another substance, thrombin, somehow attracts or gives rise to fibrinogen, and out of the action and reaction springs that saving process—clotting of the blood—which Albert P. Matthews of Chicago University calls “essentially the crystallization of a protein substance, fibrin, in the form of liquid crystals which coalesce, to form fibrin strings.” This is all very clear, of course. But though we know next to nothing of the how of the process, clinically the result is a vital matter.

We know physiologically that blood clotting is accelerated by raising the temperature and retarded by lowering the temperature, and yet we slap on ice bags following tonsillectomy, presumably for their reflex effect upon vasomotor constriction. But hot pledgets, not too hot, inserted directly into the wound will act as magically to check hemorrhage in the throat as in other surgical fields. Personally, we have better results by banishing the ice bag as a postoperative routine and administering five to ten grains of phenacetin with or without one-eighth of morphin for adults, after the stomach has reached postanesthetic quiet, to control early pain.

The laboratory again tells us that blood clotting is stimulated by the administration of an anesthetic, a point perhaps in favor of the good old ether anesthetic versus local anesthesia. On the other hand, says the laboratory, addition of carbon dioxid and withdrawal of oxygen lessens the tendency to clotting. This may partly account for the initial free bleeding in ordinary cyanotic gas anesthesia, or gas oxygen anesthesia, administered improperly. This is one reason why we personally do not like a so-called gas oxygen anesthetic in tonsil work, if it is given by an assistant inexperienced with it. But when administered by an expert, using an up-to-date device, accurately releasing each gas in the mixing chamber, there is no anesthetic to compare with gas oxygen in tonsil surgery. The patient thoroughly under should not show any cyanosis whatever.

Again, the physiologic laboratory demonstrates that blood received in an oil lined receptacle, under an oil film, clots slowly. This principle, applied in the use of short gauze strips boiled in vaselin at the time of operation, gives support to tissue, a clean surgical dressing, with less irritation than dry gauze or sponges. The blood does not penetrate its meshes to clot in a hard mass, difficult to remove and painful in the process. When such oiled packing is not too fine, enough seepage takes place to eliminate cocain still remaining in the tissues and to relieve congestion after the operation.

That calcium salts added to drawn blood stimulates coagulation is a familiar fact experimentally. Clinically, calcium salts have not stood up to the theory when administered inter-

nally, though we are still in the habit of giving calcium lactate or chlorid. But applied to the wound upon pledgets soaked in one or two per cent solution, as advised by Kean of Philadelphia, chlorid of calcium is of distinct benefit in checking and preventing hemorrhage. The internal use of gelatin is illogical as, according to Sahli, it does not reach the blood as gelatin. Adrenalin internally is reported to be inert by some, though advised by others, as a raiser of blood pressure; it seems to be contraindicated except for the local effect, as all of us are accustomed to use it. However, in our appreciation of adrenalin we err too often in using it too concentrated. A 1:1000 solution produces a powerful contraction and quite as radical relaxation afterward, as action and reaction are apt to correspond. In our own experience a strength one-fourth or one-tenth the commercial solution will give better results.

But the most useful of all means by which we overcome pathologic hemorrhage is that other product of the physiologic laboratory, the knowledge that blood serum, or, under proper circumstances, whole blood, introduced into the circulation stimulates clotting as it does in drawn blood. To the report of Weil in 1907 concerning his studies of hemophilic blood, we owe most of our brilliant results with the use of animal serum in checking hemorrhage.

In brief, we know that animal serum injected into a seemingly hopeless hemophilic will usually save the patient. It will act as well in many cases of purpura and other little understood hemorrhagic types. Its prophylactic power when introduced into known bleeders will bring about a normal condition which in hemophilia will last for three weeks or as many months, and thereby permit surgical procedures which were otherwise impossible. Though rabbit, beef, horse and human serum produces like beneficial effect, heterologous serums are inferior to human serum in some essentials. Beef serum is not to be used because of its severe anaphylaxis. Horse serum is less anaphylactic, but at times seriously so, as illustrated in the use of diphtheria antitoxin. Blood serum from one of the same family is preferable, because of the great danger of anaphylaxis if unrelated human serum or heterologous serum is used. Fresh normal human blood serum

is obtained, precisely as in making a Wassermann. Serum obtained by centrifuging is less active than that obtained in the clotting process. Serum older than forty-eight hours loses in activity with age, even though it be kept properly cool and aseptic. Twenty to forty cubic centimeters, repeated in eight to twenty-four hours, is safe dosage, unless anaphylactic symptoms contraindicate; in this case human serum will fill the bill. Precipitated serum in the form of powder is approved because of its availability at critical moments. Coagulose, applied dry or in solution, has proven exceedingly reliable in epistaxis, after adenoid removal, in tonsillar hemorrhage, and in a simple obstinate case of bleeding after a tooth extraction. Coagulose is made from human blood serum, and is theoretically far superior to coagulin from horse serum. But with coagulin we have had little personal experience.

How far is the coagulation test advisable as a routine in operative rhinotolaryngology?

We have not used it invariably and have, fortunately, never yet lost a case from hemorrhage. But the same principle of nonuse applied in the field of fire insurance would be disastrous in the long run. We have in a large number of tonsil cases used ampules of pituitrin with satisfaction. M. A. Goldstein in 1913 recommended systemic coagulation tests in every case of prospective tonsillectomy, and a serum injection when the coagulation time exceeds seven minutes. This is probably good practice, but will probably never become popular in the light of majority operative freedom from hemorrhage. Fleisch emphasized the prophylactic use of animal serum in 1911. Welch reports one hundred per cent cures in the New York Lying-in Hospital in hemorrhage of the newborn, which, by the way, is not hemophilia, but more akin to purpura. On the other hand, the October 26, 1912, issue of the *Journal of the American Medical Association*, details a fatal case of hemorrhage in a child fifteen months old, from accidental wound of the tongue, despite subcutaneous use of human serum. The question is in that case whether direct transfusion of the family blood might not have resulted differently.

Surely, no laryngologist can allow a patient to die of hemor-

rhage without resorting to transfusion, if there is time, despite the dangers of infection, thrombosis, emboli and hemolysis. The syringe canula system of transfusion described by Dr. E. Lindermann, in the October 31st issue of the *Journal of the American Medical Association*, has made the procedure less of a bugbear. Perhaps the best recent collaboration upon the subject of serum treatment of hemorrhage is that by Dr. Henry Forbes, March, 1916, in the ANNALS OF OTOTOLOGY, RHINOLOGY AND LARYNGOLOGY. The bibliography he has gathered is well worth investigating.