CLINICAL RECORDS

DEATH AFTER TONSILLECTOMY.

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PERCY P., aged 32 years, was admitted on 17th January 1921 for removal of tonsils by dissection. On 18th January his fauces were anæsthetised according to the technique used by me by infiltration with 2 per cent. novocaine hydrochloride to which adrenalin had been added to make a 1.60,000 solution, and of this some 200 minims (12 c.c.) were injected. Finding, however, that his deafness prevented him responding to those instructions as to slight changes of position which are necessary for this operation, I decided to give him a general anæsthetic after the completion of the other operations for which preparation had been made. At 5 P.M. he was anæsthetised with a chloroform and ether mixture. This was about two and a half hours after the local anæsthetic had been administered. The tonsils were removed without difficulty and without undue trauma. The hæmorrhage, though free, was not excessive, but as oozing was persistent I sutured the pillars with two mattress sutures on either side. We were careful to see that the patient had completely recovered from the anæsthetic before he was removed from the operating table. These procedures had prolonged the operation, and it was then 5.50 P.M. The oozing had been sufficient to make me anxious, and at 8.30 P.M. I rang up the house surgeon to learn how the patient was; he informed me that the oozing had begun again, and that he was just going to deal with the case and would let me know how things were. At 10 P.M. I learnt that he had stopped the bleeding, but that as the man's pulse was somewhat rapid he proposed giving some saline.

I continue these notes by quoting from the report prepared for the Coroner by the house surgeon.

"I started to give the patient a general anæsthetic at 5 P.M., and it lasted for fifty minutes while Mr Layton removed the tonsils. A good deal of hæmorrhage occurred during the operation, but on putting the patient back to bed the hæmorrhage had apparently ceased. At 8.15 P.M. I saw the patient again. There was considerable oozing of blood, and the patient had become somewhat collapsed from loss of blood; he was perfectly conscious, and consented to have another operation done with a view to stopping the hæmorrhage. Under a general anæsthetic lasting for thirty minutes and given by a staff anæsthetist, I thoroughly cleaned out the throat and applied

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pads to both tonsillar fossæ, kept up continuous pressure for some time, and finally painted the fossæ with a little turpentine." (These steps necessitated the removal of the sutures that had been inserted.) "The hæmorrhage then ceased, and half a pint of warm normal saline was given into the axillæ, together with a hypodermic injection of morphia, gr. ¼. After this, the patient became quieter for a time, but I saw him again at about 11 P.M., when hæmorrhage had recommenced. I then called the resident surgical officer for the week to see the patient, and he found blood oozing from the left tonsillar fossa. He applied firm pressure by means of a special clamp" (Watson William's pattern) "which was left *in situ*, and on his recommendation a second injection of morphia (gr. ¼) was given. The bleeding then ceased completely and the patient became quiet, and from this time on no fresh blood was coughed up at all. At 2 A.M. I saw him again and was satisfied with his condition; the pulse was rather weak and the face pale, but this was consistent with the fact that he had lost a large quantity of blood. The clamp was removed from the tonsillar fossa at 3.45 A.M., and no further hæmorrhage occurred. I saw the patient again at 4.5 A.M., and found that he was very collapsed; the pulse was almost imperceptible at the wrist, and the heart was beating rapidly, while the respirations were about 20 to the minute. Subcutaneous injections of ether (min. x) and strychnine (min. viii) were given immediately but they were ineffectual, and the patient died at 4.30 A.M."

Our natural deduction was at first that this was a case of "Cardiac failure brought on by Post-operative Hæmorrhage following an operation for Tonsillectomy," and such was the report sent to the Coroner. The resident surgical officer said to me next day that he wished he had done a blood transfusion, but that when he saw the patient he did not think he had lost enough blood to make this necessary.

The post-mortem was made by Dr E. P. Poulton, who made the following report:—

Lungs—Œdematous, friable, and full of blood probably aspirated down. Pulmonary arteries contained clots, one of which was seen to be bent on itself when taken out, indicating some degree of pulmonary embolism; it must have been a recent clot as the surface was quite smooth.

Heart—Large. Right ventricle full of blood. Muscle good. Aortic valve showed vegetations, two cusps of the valves being adherent to each other. Acute infection on the top of chronic endocarditis. The valves were also hard and thick. There was aortic stenosis.

Aorta—Minute trace of atheroma in thoracic aorta.

Kidneys—Old infarcts in both. Retention cyst in left.

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Death after Tonsillectomy

Manner of Death—Viscera not blanched, which suggests that death was not due to hæmorrhage but to embolism.

It is easy to raise a thousand criticisms upon a case such as this; but no one, however zealous, can put forward so many as he who has been in charge of the case. It is far more difficult to put the finger on any one point at which a different action would with certainty have led to a different result; and while the writer wishes to discuss certain mistakes that were made in the case, he is unable, after profound thought, dogmatically to state that the avoidance of any one of them would undoubtedly have turned the scale.

If there be any such point, it is probably in the removal of the tonsils two and a half hours after an infiltration by novocaine and adrenalin into the surrounding tissues. Hajek used to teach that adrenalin should never be injected with the local anæsthetic in this operation, and the writer refrained from doing so until he learnt that its use was the routine with some surgeons. In ordinary circumstances he has had no reason to regret it. Even where some delay has occurred, so that the anæsthetic effect is already passing off when the operation is completed, the hæmostatic effect is good, and it would appear that the clot is firm in the cut vessels before the constrictor effect has passed away. Two and a half hours is, however, a longer lapse of time than is usual if the tonsils are removed without a general anæsthetic, and it is very probable that the operation was performed in this case at the period in which the constrictor effect of the solution had passed off and left the vessels relaxed, with a loss of tone in their muscular coats. It would seem that if after infiltration with a local anæsthetic general anæsthesia is found to be necessary and cannot be administered at once, it would be well to defer the operation to another day.

Though the performance of the operation at this moment may have been the turning-point in the case, it was not solely responsible for death. The man did not die of collapse from hæmorrhage; the total amount of blood lost was not so great as to kill even a man of his diminished vitality. Though in the report to the Coroner he is described as having lost "a large quantity of blood," the total amount cannot have exceeded 100 c.c., or at the outside 150 c.c. A young surgeon with experience in cases of hæmorrhage seen during the past few years in France did not think, five hours before death, that the

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patient needed a blood transfusion. The pathologist found the "viscera not blanched," and thought that the embolism rather than the hæmorrhage was the cause of death. Are we then to consider that embolism occurred in a patient who had already caused us anxiety from hæmorrhage, or must we link the hæmorrhage with the embolism and so make the former a remote though not the immediate cause of death?

Before I consider the answer to this question, I would draw attention to the way in which the case exemplifies the principle that a sudden change of plan may lead to a disaster. The man was placed upon the table and a cursory examination of the chest was made, but it was never discovered that he was suffering from aortic stenosis. Had we intended from the first to perform the operation under general anæsthesia, a more careful physical examination would have been carried out, the cardiac lesion would have been discovered, and the indications for operation reconsidered; in this case probably no operation would have been done. Not that the cardiac condition need be considered as a necessary contra-indication to operation; the physicians of to-day are asking us to remove the tonsils in cases of endocarditis, and were a physician to ask me to do so in such a case again I should not hesitate. It may even be that if this man had had his tonsils removed some months before, the acute endocarditis which was found upon the thick adherent valves would never have arisen.

To return to the question put in a former paragraph. I do not think it right to assume that the embolism was an accidental occurrence in a person who had had some hæmorrhage; we must consider that, in some way, the latter was the cause of the former in whole or in part. Loss of blood causes a fall of blood pressure, and thus a lessening of the coronary circulation. This results in a weakening of the heart's beat, and so the blood courses more slowly through the system. Now we must concede that a fall of blood pressure is more likely to impair the force of the heart when this is damaged than when it is healthy, hence in this case the blood would have flowed more slowly even than it would have done in a healthy person after the same loss of blood. It is the sluggishness of the stream which provides the factors essential to the intra-mural clotting of the blood, or the accretion of further clot to one already circulating in the blood-stream. Suppose that the clot originated in one of the venules in the tonsillar area that had been cut during the

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operation, under ordinary circumstances it would have passed so rapidly through the heart into the lung that, at the most, it would have caused an infarct in that organ; but in this debilitated man with the stream flowing slowly as the result of loss of blood it was delayed in its passage through the jugular vein and auricle, passed into some back current among his cordæ tendiniæ, and then being increased in size during its wanderings rushed into a larger pulmonary branch. There are some who say that these emboli form usually in the auricular appendix among the musculæ pectinatæ of this part; if this be so, we have the slowing of the stream arising from the loss of blood alone to account for the formation of the clot.

It has been said that there is always a bleeding-point to account for tonsillar hæmorrhage. In this case I did not find it. I do not think the statement correct. I am willing to admit that the more carefully you search for such a point, the more often are you likely to find it. I am willing to admit that such a point may be there even if you do not find it, but in such cases a gush from some area of the cavity is evidence that it is there. In this case there was no such gush, and I believe the hæmorrhage was a general ooze from arterioles and venules. It has been further said that deaths from hæmorrhage would not occur were the surgeon always to secure the bleeding-point before the patient leaves the table, but this does not cover those occasions where bleeding occurs after the patient has come round from the anæsthetic during the period of reaction. I think that this case teaches that control of a bleeding-point during the operation does not cover the whole question of hæmorrhage in tonsillectomy.

It also offers an answer to the question that is sometimes put, whether suture of the pillars of the fauces will always control such hæmorrhage, for it shows that it does not. I believe that this point is closely connected with the last. For when there is a bleeding-point in the tonsillar bed upon which it is difficult to put an artery forceps, a mattress suture which includes the area from which the bleeding is coming will stop the hæmorrhage, and will stop it at once. In this case the suture did not at once stop the bleeding; when the left fauces had been sewn up the right tonsil was removed, and when this was accomplished there was still an ooze from the left side. I would suggest that for arrest of hæmorrhage from a single bleeding-point, suture of the pillars is efficacious when the suture

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controls the point, but that in the case of a series of minute bleeding-points which constitute an ooze, suture by itself is insufficient. It is probable that in this case the proper thing to have done was to have plugged the tonsillar cavity with a roll of gauze, and to have sutured the pillars across it. One other thing might have been done, to have stood the patient up after he had recovered from the anæsthetic and, by allowing him to faint, to have called more fully into play the natural arrest of hæmorrhage. It is since the occurrence of this case that my attention has been called to the great importance of this point by Dr Logan Turner.

There remains for discussion the question whether some deficiency in the clotting power of the blood was a factor in the case. American writers have recently urged that the coagulation period of the blood should be estimated in every patient before a tonsillectomy is done, in order to know when one is dealing with those rare cases in which a deficient coagulation power of the blood may endanger the life of the patient. In this case the possibility is excluded by the fact that the man died from a thrombus passing into his lung. It would seem that the condition is so rare that the routine examination of the blood for this purpose is a process, the labour of which is out of all proportion to the result to be obtained. No such case has been published in this country among the thousands of operations that have been done. Deaths have occurred from tonsil operations, and most of these cases are exhaustively discussed after careful investigation, but so far as the writer knows, deficient coagulation has been the cause of death in none of them. Series of 18,000 and 14,000 tonsil operations have had references made to them of late without this complication being met with.

REFERENCE.—"Blood Examination in the Surgery of the Nose and Throat," Dr Seymour Oppenheimer and Dr Mark J. Gottlieb, New York City, *Laryngoscope*, vol. xxix. No. 7, July 1919.

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