since the boy was discharged from hospital; so far there has been no return of symptoms.

I am indebted to Dr. R. A. Veale for permission to publish this case and to Professor M. J. Stewart for his kind advice.

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OEDEMA IN THE NEWBORN*

BY

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Oedematous conditions in the newborn are of fairly common occurrence, but experience seems to show that it is difficult for the average man faced with a case of this kind to form a clear idea in his mind of the most likely cause of the disorder and of the appropriate treatment. A study of the textbooks does not usually help very much: they describe congenital oedema, oedema neonatorum, scleroedema, sclerema, sclero-oedema, etc., but no two authors seem to agree exactly as to the precise definitions.

With the idea of simplifying this subject a little I have collected a few cases, with oedema as the leading physical sign, in which it will be observed that the main aetiological factors are cold and sepsis. I am excluding entirely those rare cases in which the baby is born with generalized oedema, ascites, and hydrothorax, or with massive oedema of the limbs, and often dies a few hours later. In general practice it is very unlikely that such a case will ever be seen, in view of the fact that only one example of this condition has been observed at Queen Charlotte's among 12,000 babies born during the last six years.

In my experience the commonest cause of oedema in the newborn, localized or generalized, is cold, and in my opinion it is absolutely essential that this should be realized by every general practitioner or nurse in charge of a newborn infant. The temperature, as taken with the ordinary clinical thermometer (with a low limit of 96°) in the axilla or groin, gives quite a false idea of the actual temperature of the infant. One must use a subnormal thermometer with a low limit of 88°. There is no difficulty in getting these in practice, and they are not expensive. The temperature must be taken rectally. Neglect of these simple precautions leads to much trouble when dealing with newborn infants, especially when they are premature or debilitated. It is quite common to hear a nurse say that the baby's temperature is perfectly normal, somewhere about 96° (the lowest reading on her thermometer), when, on putting a hand on the baby's abdomen and legs they feel definitely chilly, and the temperature taken rectally with a subnormal thermometer is found to be 93° or even lower. The importance of warmth for the newborn infant is, I think, still not fully appreciated, and, naturally, the more feeble and premature the child the more the necessity for keeping a close watch on the temperature. I have seen a child, three or four days after birth, in a cold house in a bad slum area, quite

chilly and blue, gasping for breath and apparently dying: rectal temperature—89°. On putting the baby into a hot bath for twenty minutes, and insisting on hot bottles, changed every four hours for twenty-four hours, being placed round it, there has been prompt recovery.

Probably many infants are certified as having died of "atelectasis," "prematurity," "congenital debility" and the like, when in reality death is due to the effects of cold.

INFLUENCE OF COLD

The newborn infant, then, is particularly susceptible to the effects of cold. The following cases, all of which occurred in this hospital, are, I think, excellent examples of cold acting as a cause of oedema.

CASE I

Twin boy, seen on December 3rd, 1931, on the ninth day of life, at Queen Charlotte's Auxiliary Hospital, Goldhawk Road, because of swelling of the penis. Birth weight: 5 lb. 6 oz. The weight had gone down to 5 lb. on the third day of life, but by the ninth day it was 5 lb. 8 oz. The mother was a primipara, aged 27, perfectly healthy; the delivery was normal, the first twin being a L.O.A., the second a L.O.P. This case was the first twin.

On the sixth day, mild oedema of the prepuce was first noticed, and when seen on the ninth day the oedema was very marked: no oedema of the scrotum. There was no difficulty in micturition and the urine was normal. Both testicles were in the inguinal canal. There was also considerable oedema of the eyelids, and pitting oedema of both feet and shins and of the scalp. Heart, lungs, abdomen, and throat were normal. Pulse rate 120. Since birth the infant had had a subnormal temperature, varying from 95° to 96°. No hot bottles had been used, but the infant had been kept in a cot near a gas fire. The baby's feet and head felt cold, and the rectal temperature was taken with a subnormal thermometer, and found to be 93°.

The baby was put in a hot bath at 105° till the temperature was 99°, and hot bottles were put in the cot, and the rectal temperature was taken four-hourly for the next four days. Next day the temperature was 96.8°, and there was much less oedema. By December 6th, 1931, the oedema was completely gone, and, as was expected, with the disappearance of the oedema the weight dropped 4 oz. in the three days. One month later the baby was completely normal.

Final diagnosis: Oedema due to hypothermia.

CASE II

In view of the above case the other twin was examined, although supposed to be quite normal. Birth weight: 5 lb. 4 oz. Weight on the ninth day: 5 lb. 4 oz. Here also the temperature had always been low, varying from 96° to 95°. On examination there was pitting oedema of the scalp, both feet, shins, and thighs, also slight oedema of the eyelids and prepuce. Urine normal. Heart, lungs, abdomen, normal. The rectal temperature was 93°. Similar treatment was adopted and in four days all trace of oedema had vanished; the loss of weight in this case over four days was 1/2 lb. One month later the baby was perfectly normal in every way.

Final diagnosis: Oedema due to hypothermia.

Oedema may occur (1) if the infant is put into a warm bath immediately after birth, without ever having had a subnormal temperature, and (2) if the temperature is subnormal. In the latter case the oedema is more frequent and more severe. Cold, therefore, is a contributory factor, but the main factors here are feeble development of the circulatory system, cardiac weakness, and blood vessels that are delicate and fragile. The oedema of the feet is largely dependent upon the effects of gravity: this can be easily demonstrated by allowing the arms and legs to hang down, when marked cyanotic swelling of the dependent parts soon develops. If the foot of the cot is raised for twenty-four hours, so that the baby's head is kept lower than the feet, the oedema of the feet diminishes in a few hours and may have

* Based on a clinical lecture given at Queen Charlotte's Hospital.

completely vanished in twenty-four hours; at the same time oedema of the scalp appears. This is not true of all cases, for occasionally the oedema of the feet lessens, but does not entirely disappear with change of posture. As the infant gets older the strength of the circulation improves, and by the age of 3 to 4 weeks all trace of oedema has usually vanished. No treatment is required for this type of oedema, beyond keeping the baby's temperature normal. Naturally if the baby is allowed to run a temperature persistently several degrees below normal the oedema will take longer to disappear.

SCLEROEDEMA AND SCLEREMA

In infants, as in adults, the capillaries are extraordinarily susceptible to cold, and if the temperature is allowed to remain subnormal for long serous exudation may take place into the skin and subcutaneous tissues, and we have the conditions known as scleroedema and sclerema. There is no sharp distinction between oedema, scleroedema, and sclerema, and one occasionally sees a case showing characteristics of two of these conditions simultaneously; in all probability it is merely a question of degree, depending on the water richness of the tissues and the anatomical distribution of the subcutaneous fat. The younger the infant the less the fat deposit, but even in the smallest premature infant the fat deposit on the external aspect of the thigh is a few millimetres thick, while elsewhere fatty tissue is extremely scarce. Consequently, if oedema of the feet is present, the skin and subcutaneous tissues over this part of the thigh always feel rather hard and firm (scleroedematous), in contradistinction to the soft oedema of the genital region and the internal aspect of the thigh and leg. If this hard, firm feeling becomes well marked, we have the condition known as scleroedema. In this the skin and subcutaneous tissues are hard and tough, and cannot be picked up properly into folds. The skin has a peculiar, mottled, dead appearance. Usually the lower limbs, especially the outer aspect of the thighs (for the reasons given above), are involved, but the condition may extend so widely up the trunk and limbs that all movements, even sucking, are difficult. The eyelids and the scrotum are never involved. The temperature is subnormal, usually about 90° to 93°, but it may be as low as 86°, and even 77° is recorded. Related to this are the extreme lack of movement, the superficial breathing, the feeble voice, and the small, slow pulse—in fact, not unlike a case of myxoedema. The treatment is simple—namely, warmth at all costs—hot baths, hot bottles, etc.—massage to the limbs, and, of course, breast-feeding. Since these cases so resemble myxoedema, thyroid extract has been given with the idea of stimulating the basal metabolism, with excellent results. Dr. Eric Pritchard recommends that ext. thyroid sicc. (B.W. & Co.) 1/8 to 1/6 grain should be given three or four times a day, and with this dosage I have seen good results when treatment is combined with warmth.

A clinical picture somewhat different from this is provided by the infant suffering from sclerema, a circumscribed symmetrical fat-sclerosis. Here the temperature is commonly raised, and the infant has small plaques in the subcutaneous tissues over which the skin is reddened; these tend to be symmetrical, especially on the cheeks, buttocks, upper arms, and thighs. They are very like multiple lipomata, but are harder and attached to the skin, not to the subcutaneous tissues. With massage, they usually disappear after a few weeks. Histologically, necrosis of the fatty tissue with sheafs of fatty acid crystals are found: also oedema, cellular infiltration, and numerous giant cells. The cause of the condition is still unknown.

OEDEMA FROM SEPSIS

The second factor we have to deal with is sepsis, and one may take the following case as a typical example of this.

CASE III

Baby John M., born at Queen Charlotte's Hospital on June 17th, 1931, with a birth weight of 6 lb. 8 oz. When seen on July 1st there was considerable pitting oedema of the right thigh reaching high up as far as the crest of the ilium; also oedema, but rather less, of the right foot and shin. No oedema of the left leg. The temperature of both legs seemed equal, and the skin was everywhere normal, apart from the oedema. Full range of movements of both legs; normal tongue. Rectal examination: nothing abnormal found. Nothing abnormal found in the heart, lungs, abdomen, or central nervous system; urine normal. For the previous week the baby had been mildly jaundiced. Breast-fed for one week, then owing to failure of breast milk the child was given an ordinary modified milk mixture. Two weeks before the baby was born the mother had had puffiness of the face and ankles. Owing to poverty, her diet had been cut down considerably during the last months of pregnancy; no fresh milk had been taken, but she had apparently taken plenty of oranges, lettuces, tomatoes, etc. No oedema of the ankles was present at this time, and the urine was normal. Hot bottles were ordered to be placed against the baby's right leg.

July 2nd.—Oedema of the right leg unchanged, but now considerable pitting oedema of the left leg, and oedema extending upwards over the pubis almost to the umbilicus. Urine (sterile catheter specimen); acid reaction, faint trace of albumin, no sugar, pus, or blood. Cultures showed a few colonies of *B. coli*. Orange juice, 1 oz. twice daily, was ordered, cod-liver oil, 1 teaspoonful daily, and plenty of water.

July 7th.—The oedema of the legs and pubis has gradually become very marked, and abdominal distension is now developing. No sign of intestinal obstruction, no ascites and nothing abdominal felt per rectum. Abdomen tense, but apparently no enlargement of the liver or spleen. Baby taking feeds well; no vomiting. Temperature varying between 98.6° and 99.8°. Weight curve stationary for the last eight days at 6 lb. 8 oz. Normal stools. Examination of a sterile catheter specimen of the urine showed no pus cells, but Gram-negative bacilli were present, which proved on culture to be *B. coli*.

July 8th.—Massive brawny swelling developing over the left thigh with two small areas of fluctuation. Much less oedema of the left leg and foot, and of the right leg. Abdomen softer. Aspiration of the fluctuating areas: 1 c.cm. of thick, yellow, stinking pus obtained, which showed a pure growth of *B. coli*. Cod-liver oil, 1 teaspoonful three times a day, and orange juice, 2 oz. daily, were given.

July 10th.—Massive oedema and infiltration of the subcutaneous tissues of the left thigh still present; pus again removed by aspiration.

July 14th.—No areas of fluctuation, but still a lot of infiltration. An incision was made down to the bone, over the anterior aspect of the femur, and a large amount of pus gushed out.

July 17th.—Thigh still very infiltrated. An incision was made over the greater trochanter down to the bone, and again pus was found. Following this, the oedema and infiltration rapidly diminished, and the child was discharged well, with the abscesses soundly healed, on August 19th, weighing 8 lb. 6 oz., and having gained nearly 2 lb. in the six weeks of treatment. Urine normal.

This child was seen at frequent intervals till the age of 6 months, and there was never any recurrence.

Diagnosis: Oedema due to deep *B. coli* abscesses of the left thigh.

GENERAL CONCLUSIONS

Nephritis as a cause of oedema in the newborn I have never seen, and judging from the literature either it is very rare or does not exist, although this diagnosis is often made. The youngest cases I know of were twins, aged 3 months, reported by Finkelstein. One baby had

intertrigo, extensive oedema, and the urine of a haemorrhagic nephritis, typical glomerulo-nephritis being found post mortem. The other twin had oedema, but the urine was normal; there was complete recovery. None of my cases quoted above ever had albuminuria, and in one child (case not recorded) that died the kidneys were microscopically quite normal. Many of the symptoms, such as oedema, which were attributed a few years ago to failure of renal function, are now believed to be extra-renal in origin, the oedema—for example, in the typical case of lipoid nephrosis (= chronic parenchymatous nephritis)—being due to a generalized disturbance of salt and water metabolism, in which the kidney shares equally with every other vascular organ.

It is perfectly possible to have severe oedema without any nephritis, and severe nephritis without any oedema. Pyelitis in the newborn is not accompanied by oedema—at least, not in the half-dozen cases I have seen—so examination of the urine in oedema of the newborn practically never gives much help.

To sum up, then, oedema is a symptom of fairly common occurrence in the newborn, especially in premature and debilitated infants; it is often directly due to the effects of cold in the capillaries and to circulatory weakness. If the condition is recognized early and treated promptly the outlook is quite favourable; whilst in cases that are febrile it is commonly an early manifestation of sepsis. Nephritis is only rarely a cause of oedema in the newborn.

LOCAL ANAESTHESIA FOR TONSILLECTOMY

BY

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The difficulty recently experienced by a colleague in finding someone willing to remove his tonsils under local anaesthesia, prompts this account of a small series of twenty tonsillectomies done wholly under local anaesthesia. The cases were adult private and hospital patients, the initial reason for local anaesthesia being the patients' desire to avoid a general anaesthetic, and a later reason the personal preference of the writer for this method. The patients were selected only in so far as they were agreeable to the method and appeared to have ordinary powers of self-control. In all cases careful examination for other foci of infection was made in order to lessen the risks of troublesome haemorrhage.

The general technique employed will be found fully described in any work on local anaesthesia, and will be briefly dealt with here, particular stress being laid on certain modifications adopted to add to the ease of the patient. It is certain that the disagreeable anticipations naturally associated with the operation can be reduced, in their fulfilment, to something definitely less than the discomforts of many a visit to the dentist. Pain should be completely absent throughout, but the anxiety caused by the sensation of strange happenings and what must feel like a score of lethal weapons being rammed home in the victim's throat—particularly if the jaw is fixed with a gag—may be so great as to place the operation outside the pale of humane therapy. The relief of these feelings, however, depends upon the handling of the case, and the extent to which it may succeed is instanced by one patient in this group who, when about to be returned to the ward, asked anxiously what had gone wrong, and complained that he was being sent back with only the anaesthetic injected. Like most ideals such a state of affairs cannot be expected to obtain in all cases, but it may be closely approximated in a great many cases ordinarily subjected to general anaesthetics.

TECHNIQUE OF ADMINISTRATION

Preliminary morphine was given only to an unduly fearful minority and the patients' co-operation gained by a short explanation of what was to be expected of them. The procedure is as follows:

1. The fauces are liberally sprayed with 10 per cent. cocaine, after cautioning the patient against swallowing any of it.

2. In five minutes the injection of 0.75 per cent. novocain and adrenaline may be commenced. A light syringe and long needle are necessary. Injections are made into the upper and lower poles and just outside the margin of the anterior and posterior pillars, about the centre. Enough should be injected to encircle the tonsil with a band of anaemic tissue and to saturate its bed, from which it will project rather more than usual if not too adherent or fibrosed. The faucial tissues should not be blown into oedematous folds with the solution.

3. By the time the second injection is finished the first tonsil will be ready for dissection. This is done with the finger or dissector and scissors, but requires considerably more gentleness than is at times used in the dissection of tonsils under general anaesthesia. In most cases the work is being done in a field which is nearly dry, and one can proceed deliberately. The smallest adhesions should be snipped instead of torn. It is at this stage that the co-operation of the patient becomes particularly valuable, as by keeping his mouth well open and pharynx relaxed he will give good exposure of the parts with the occasional help of a tongue depressor used only lightly. Any form of gag should be avoided, as being too uncomfortable for the conscious patient. At any stage the partially dissected tonsil may be held with a swab whilst the patient is allowed to relax his jaw and rest; indeed, these spells may be encouraged if the tonsil be looked on as a piece of raw tissue and an efficient haemostat.

4. After the removal of the second tonsil is completed swabs held in the tonsillar fossae for a few minutes suffice to reduce the haemorrhage to a point which just colours the saliva, and the patient is able to walk back to the ward or be driven to his home.

COMMENTARY

In no case was there enough bleeding to require the use of a suction apparatus to maintain a clear view of the field of operation throughout. Some of the cases were practically bloodless. The only complaint made in the first hour or so after the operation was the difficulty in swallowing. As the effects of the anaesthetic passed off the patient seemed to complain of rather more first-day pain than is found in the case of those receiving a general anaesthetic. This, however, would be explained by the lack of the dulling effect of a general anaesthetic and a certain sense of disappointment following their early cheerfulness. In no case was there any troublesome reactionary haemorrhage, the total blood lost seeming only a fraction of that usually experienced. There was no appreciable difference in the convalescence. Perhaps the use of some other solution giving a more prolonged partial anaesthesia, or the dusting of the tonsil bed with some such substance as anaesthesin powder, would considerably lessen the after-pain and leave the patient with only pleasant memories of his tonsillectomy.

Without entering into any controversy as to the surgical virtues of avoiding a general when a local anaesthetic serves as well from both patient's and surgeon's point of view, it is suggested that the local is a perfectly practical and satisfactory method for tonsillectomy in adults. As with any local anaesthetic properly used, rather more time must be allowed: the average time in these cases