Possibility of Resuscitation

It is suggested that in the great majority of cases reported as successfully resuscitated the application of this very sensitive test would have shown that the circulation continued. It remains to be seen if any patient in whom this sign has become positive can be restored to life. Under laboratory conditions, with the chest opened and the heart exposed, it is easily successful. Whether or not it can be undertaken in the operating theatre or under other clinical conditions will depend largely on the length of time the vital centres can be deprived of their blood supply without fatal result. Our opinions on this point may even require revision as a result of the application of this test. As a guide to attempts at resuscitation the following outline is suggested.

1. The retina appears as in health. The heart is still functioning and artificial respiration offers excellent prospect of saving a life.

2. Movement of blood in the retinal veins is visible. The heart has recently stopped and artificial respiration and attempts to start the heart are both indicated. The rate of the movement and the degree of fragmentation will be of assistance in determining the prognosis. In the absence of direct cardiac massage the chance of recovery must be small, but, in view of our lack of experience with this test, an attempt at restoration should be made.

3. Fragmentation is visible but all movement has ceased. It seems quite impossible that recovery can take place after this stage has been reached. The general application of this simple test would remove all trace of one of the most haunting fears of mankind—the chance of premature burial.

We are not prepared to make any definite statement as to how long after death the retina remains plainly visible. We have noted some lack of definition by the time all movement has ceased, but this has appeared to be due to drying of the cornea rather than to any actual change in the refracting media. With a history of normal vision inability of a trained examiner to see the retina may itself be accepted as evidence of death, provided the pupils are dilated and the corneas moist.

Should repeated observations on the human subject establish a relatively constant time for the production of complete opacity important medico-legal application might be expected. As it is, the ability to estimate the time of death with reasonable accuracy may occasionally be of legal value, although limited at present to about fifteen minutes.

No expert skill is required to make this test. If the vessels are plainly visible the movement should be readily detected. Examination is greatly facilitated by the wide dilatation of the pupils, invariably present. Only experience will enable one to recognize the finer details for the estimation of the time factor. If the possibilities of this application of the ophthalmoscope will lead a greater number of practitioners to avail themselves of the services of this valuable instrument a definite advance in the standard of diagnosis may be confidently expected. Incidentally it may be worth mentioning that a considerable experience may be acquired by examining one's household pets.

As a confirmation, or otherwise, of the results of our laboratory experiments we should be pleased if some physician would synchronize the appearance of this sign, in a human patient, with the electrocardiogram.

Summary

An ophthalmoscopic phenomenon is described, it is believed, for the first time. Experimental evidence is advanced to explain the visible facts, and suggestions are offered for its clinical application.

HYPERCHROMAFFINISM

BY

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Pathology

Hyperchromaffinism is a clinical condition due to an excessive secretion from the chromaffin cells of the suprarenal medulla. The condition has no connexion with tumours of the adrenal cortex, and sexual changes are not to be expected and do not occur.

The following scheme represents the changes that take place in the development of the adult chromaffin cell from the primitive neurocyte.

Medullary tumours may be simple or malignant and are rare, occurring in 1 in 3,950 consecutive post-mortem examinations, according to Saphir. The malignant type arises from the sympathogonal cell and occurs in the newborn or in very young children. A case is recorded by Peters and Horn¹ in a child aged 2. The child was listless and presented a swollen abdomen due to the presence of free fluid. There was massive enlargement of the liver and death occurred rapidly. A tumour of the right suprarenal was found at necropsy.

Simple tumours are phaeochromatocytomata and give rise to paroxysmal sympatheticotonia. According to Laubry and Bernai⁴ the symptoms are paroxysmal in the early stages and become permanent later when changes have occurred in the cardiovascular system. An excessive action of the sympathetic nervous system is to be expected because adrenaline is the necessary connecting link between the sympathetic nerve end and the structures which are under its control.

Symptomatology

Phaeochromatocytomata are associated clinically with:

1. Paroxysmal hypertension.
2. Glycosuria.
3. Periodic tachycardia.
4. Attacks of pallor followed by flushing of the skin.
5. Headache, nausea, and vomiting.
6. Attacks of coma due to hypertensive encephalopathy.
7. Dyspnoea and choking.
8. A susceptibility to shock.
9. Pulmonary oedema.
10. Occasionally von Recklinghausen's disease.
11. Cardiac hypertrophy on post-mortem examination.

The susceptibility to shock mentioned above is important from a surgical point of view as it may occur during the course of an operation. It is recorded by several observers. Belt and Powell² record a case in a Jewess aged 45 who had a blood pressure of 170/80. An anaesthetic was given and the patient became alarmingly ill with a blood pressure of 300/240 before the operation had started. She was sent back to bed and died the next day. At the post-mortem examination a tumour of the right suprarenal was found. Collar, Field and Durant³ record a case in a boy of 16 who had a tumour of the right adrenal. His blood pressure was 125/105 but rose enormously during the attacks. When the blood pressure was at its height it could be reduced by 100 mm. of Hg by the administration of amyl nitrite. He was given gas and oxygen as an anaesthetic but collapsed under it and was returned to bed. Two days later he was given ether, and although the blood pressure rose to 300/140 in an

hour a tumour was successfully removed from his right adrenal.

A tumour may be suspected from its symptoms, and it may be palpable on bimanual examination in the renal area. An excretion pyelogram may be of help in making a diagnosis. If the tumour is pressing the kidney downwards this may show on the *x*-ray photograph, or the kidney may be rotated in such a way that the ureter is kinked and a hydronephrosis results.

Paroxysmal hypertension may be due to other conditions which must be excluded in making a differential diagnosis.

1. Uraemia.
2. Subacute meningococcal meningitis.
3. Angina pectoris.
4. Rheumatic heart disease.
5. Carcinoma of the oesophagus and lymphosarcoma of the mediastinum causing pressure on the vagus.

It was suggested by Belt and Powell² that the typical symptoms of a tumour might occur and yet there might be no tumour present. Under these circumstances they suggest that there might be a condition of hyperchromaffinism analogous to a hyperthyroidism.

Case Report

The case I wish to place on record presented very definite attacks of hypertension associated with coma.

A female aged 19 was quite well until April, 1934, when she had a sore throat and occasional headaches. On April 19th she fainted on the way home from work and was put to bed, where she gradually became unconscious. She remained comatose for a week and was eventually brought round by venesection. During this attack her blood pressure was 218/140. Lumbar puncture showed the cerebro-spinal fluid to be normal but under a considerably increased pressure. The urine contained albumin in large amount, sugar, and acetone. The blood sugar estimation was normal and the blood urea 31.4 mg. N per 100 c.cm. During this period she was incontinent and had several convulsions. In May, 1934, her urine contained a trace of albumin and her blood pressure was 170/130. Since that time she has continued to have attacks of headache and vomiting about once a fortnight. The attacks last about four days. Menstruation is normal.

She was admitted to hospital on March 2nd, 1935, and her blood pressure was 200/130. There was no albumin or sugar in the urine. On March 8th her abdomen was opened under ether anaesthesia after giving avertin as a basal anaesthetic in a dose of 0.08 gram per kilo of body weight; both adrenals appeared to be normal; and, on the supposition that the case might be one of hyperchromaffinism, the left one was removed. She gave no real cause for anxiety during the operation but her convalescence was stormy for the first few days. Her blood pressure rose to 260/180 and she had a convulsion on the night following the operation. Her condition gradually improved and a fortnight later her blood pressure was 175/120. She had one attack of headache and vomiting in April and a slight attack in July. Otherwise she has been free from attacks and has gained seven pounds in weight. She has not returned to work and her blood pressure is now 216/144.

The pathological report on the left adrenal is that the capsule contains an unusual amount of unstriped muscle and that the adrenal vein is enormously thick-walled. There is no other abnormality in the gland.

Discussion

The case may be claimed as a partial success in that the paroxysms of hypertension have been relieved. The patient falls into the second category of Laubry and Bernai⁴ as she has a permanent rise of blood pressure. This rise might be due to the late effects of the hyperchromaffinism which would cause hypertrophy of the heart and thickening of the blood vessels, but there is no evidence of either of these conditions. Physical examination shows a strongly acting heart but no obvious enlarge-

ment, and *x*-ray confirms this. There is no appreciable thickening of the radial artery. The rise in blood pressure is due presumably to the presence of a pressor substance in the circulation, either adrenaline or more probably an abnormal secretion from the adrenal in the form of a chemical precursor of adrenaline.

Further removal of part of the right adrenal has been considered and would seem to be logical. It has not been done because operative interference with part of the gland may lead to thrombosis of the vein and a resulting infarct of the gland itself, a grave risk in the presence of only one gland. She is being given deep *x*-ray therapy to the right adrenal and says she is definitely better as a result of this treatment.

REFERENCES

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- ³ Collar, Field, and Durant: *Arch. of Surg.*, 1934, xxviii, 1136.
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Clinical Memoranda

Evipan Sodium Treatment of Ether Convulsions

A female patient, aged 5 years, was admitted to the Manchester Jewish Hospital on March 20th suffering from acute mastoiditis of the left side. The child was extremely toxic in appearance, had a temperature of 103° F., a pulse rate of 174 per minute, and respirations were 32 per minute. Premedication consisted of an injection of atropine sulphate (1/100 grain).

ANAESTHESIA

Anaesthesia was induced rapidly by the ethyl chloride-ether sequence, using an Ogston type of inhaler, and was maintained with Shipway's apparatus without heating the vapour. During induction two convulsive spasms were noticed, but these passed off with deeper anaesthesia. A simple Schwartz operation was performed, and the dura of the posterior fossa and lateral sinus was found to be covered with septic granulation tissue. The lateral sinus was incised, and a blood clot floated out; free bleeding was established from both ends of the divided sinus. The sinus was packed and the operation hurriedly completed.

While the bone was being chiselled slight twitchings of the hands and face became apparent. These rapidly increased in violence and distribution until the whole body musculature became involved, it being found necessary to hold the patient down on the table. The administration of the anaesthetic was stopped immediately and an oxygen-carbon-dioxide, 5 per cent., mixture substituted. The waterproof coverings and blanket were removed from the patient. Compression of the carotid arteries, raising the patient's head, and cold sponging had no effect on the condition. The pulse rate was above 200 per minute and respirations were extremely rapid and shallow.

Evipan sodium solution was then injected into one of the veins in the antecubital fossa, and the convulsions began to subside after rapidly introducing 1½ c.cm. A further 1½ c.cm. was injected more slowly, after which the convulsions ceased entirely. The wound was dressed and the patient returned to bed, the foot of which was raised on blocks. The administration of the oxygen-carbon-dioxide mixture was continued in the ward to expedite de-etherization. The pulse became progressively slower and fuller as the normal reflexes returned. The child was able to answer to her name one hour after her return to bed, but was drowsy for several hours. Since then the patient has made an uneventful recovery.

COMMENTARY

This case of extremely severe ether convulsions was completely and rapidly controlled by intravenous evipan sodium after all other suggested lines of treatment had