reaches the tissue cells, where it reacts with their antibody, leading to a local anaphylaxis, the so-called hyperergic inflammation. Levinthal suggests that the basic lesion is a debility of antibody-forming mechanism which does not permit of that prompt response necessary for effective disposal of infection. He regards the micro-organism merely as a source of antigen, the streptococcus being operative in some 90 per cent. of cases, while other bacteria may be responsible in the remainder. Dawson *et al.* (1932) have shown that the formation of serum agglutinins in rheumatoid arthritis is a very slow process, requiring months of active disease before high titres are reached. He and many others have observed that the titres tend to fluctuate in a remarkable way on repeated tests. Following Levinthal's views, such periods of intermission would leave the tissues vulnerable to attack.

It will be noted that the evidence is explicable by a hypothesis which is essentially similar to that of Swift in the case of rheumatic fever. It assumes that the agglutinins are true immune antibodies, and their presence is accepted as evidence of the continued presence of the streptococcus, although Dawson *et al.* (1932) suggest that neither assumption is fully justified on available evidence. Again, the fluctuating serum titre may recede, leaving antibody temporarily locked in the joint fluid, a circumstance which would explain the combination of "serum negative; joint fluid positive" upon which the theory is based.

Space does not permit of any further consideration of the great mass of recent work on chronic rheumatism. Hench (1938) has examined the evidence critically, and concludes as a clinical investigator that it still remains to be proved that the disease is infective in origin; as a practising physician he has committed himself with reservations to the microbic theory. This is a perfectly accurate summing-up of the present unsatisfactory position. From epidemiological considerations we may be fairly certain that acute rheumatism is infective; even this is denied us in the chronic forms. But the present revival of interest in rheumatism must in the near future produce results which will do something to remove this uncertainty.

REFERENCES

Blair, J. E., and Hallman, F. A. (1935). *J. clin. Invest.*, **14**, 505.
Bland, E. F., and Jones, T. Duckett (1935). Ibid., **14**, 633.
Bradley, W. H. (1932). *Quart. J. Med.*, N.S., **1**, 79.
Cecil, R. L., Nicholls, E. E., and Stainsby, W. J. (1929). *J. exp. Med.*, **50**, 617.
—— —— —— (1931). *Amer. J. med. Sci.*, **181**, 12.
Clawson, B. J. (1925). *J. infect. Dis.*, **36**, 444.
Coburn, A. F. (1931). *The Factor of Infection in the Rheumatic State*, Baltimore.
—— (1933). *Amer. J. Dis. Child.*, **45**, 933.
—— (1936). *Lancet*, **2**, 1025.
—— and Pauli, R. H. (1932a). *J. exp. Med.*, **56**, 609.
—— —— (1932b). Ibid., **56**, 633.
—— —— (1932c). Ibid., **56**. 651.
—— —— (1935a). Ibid., **62**, 129.
—— —— (1935b). Ibid., **62**, 137.
—— —— (1935c). Ibid., **62**, 159.
—— —— (1935d). *J. clin. Invest.*, **14**, 755.
—— —— (1935e). Ibid., **14**, 763.
—— —— (1935f). Ibid., **14**, 769.
—— —— (1935g). Ibid., **14**, 783.
Coles, A. C. (1935). *Lancet*, **2**, 125.
Collis, W. R. F. (1931). Ibid., **1**, 1341.
Cox, K. E., and Hill, D. F. (1934). *Arch. intern. Med.*, **54**, 27.
Dawson, M. H., Olmstead, M., and Boots, R. H. (1932). *J. Immunol.*, **23**, 187, 205.
—— and Tyson, T. L. (1935). *J. Lab. clin. Med.*, **21**, 575.
Eagles, G. H., Evans, P. R., Fisher, A. G. T., and Keith, J. D. (1937). *Lancet*, **2**, 421.
Eason, J., and Carpenter, G. (1937). *Quart. J. Med.*, N.S., **6**, 93.
—— and Thomson, W. A. R. (1934). *Edinb. med. J.*, **41**, 583.
Gibson, H. J., and Thomson, W. A. R. (1933). *Edinb. med. J.*, **40** (Med.-Chir. Soc.), 93.
Hadfield, G., Magee, V., and Perry, C. B. (1934). *Lancet*, **1**, 834.
Hench, P. S. (1938). *A Survey of Chronic Rheumatic Diseases*, p. 35, London.
Keefer, C. S., and Spink, W. W. (1937). *J. clin. Invest.*, **16**, 155,
Klinge, F. (1936). *Acta Rheum.*, **8**, No. 30, 4.
Levinthal, W. (1938). *Proceedings of Rheumatism Congress*, Bath (in press).
McEwen, C., Alexander, R. C., and Bunim, J. J. (1935). *J. Lab. clin. Med.*, **21**, 465.
Keefer, C. S., and Spink, W. W. (1937). *J. clin. Invest.*, **16**, 155.
—— —— and Holmes, W. F. (1934). Ibid., **13**, 767.
Nicholls, E. E., and Stainsby, W. J. (1931). Ibid., **10**, 323.
Poynton, F. J. (1938). *A Survey of Chronic Rheumatic Diseases*, p. 25, London.
—— and Paine, A. (1913). *Researches on Rheumatism*, London.
Schlesinger, B. (1930). *Arch. Dis. Childh.*, **5**, 411.
—— Signy, A. G., and Amies, C. R. (1935). *Lancet*, **1**, 1145.
—— —— and Payne, W. W. (1935). Ibid., **1**, 1090.
Seegal, D., and Lyttle, J. D. (1933). *Proc. Soc. exp. Biol.*, N.Y., **31**, 211.
Shapiro, M. J. (1935). *J. Lab. clin. Med.*, **21**, 564.
Sheldon, W. (1931). *Lancet*, **1**, 1337.
Stuart-Harris, C. H. (1935). Ibid., **2**, 1456.
Swift, H. F. (1935). *J. Lab. clin. Med.*, **21**, 551.
—— Moen, J. K., and Hirst, G. K. (1938). *J. Amer. med. Ass.*, **110**, 426.
Todd, E. W. (1932). *Brit. J. exp. Path.*, **13**, 248.
Wilson, M. G., Wheeler, G. W., and Leask, M. M. (1934). *J. clin. Invest.*, **14**, 333.

ALCOHOL INJECTION IN INOPERABLE MALIGNANT GROWTHS OF THE JAWS AND TONGUE

BY

WILFRED HARRIS, M.D., F.R.C.P.

Consulting Physician, St. Mary's Hospital; Physician to the Maida Vale Hospital for Nervous Diseases

Carcinoma of the tongue and malignant growths in the facial bones, especially in the antrum, maxilla, and naso-pharynx, whether they are called sarcoma, carcinoma, or endothelioma, are in the first instance naturally the affair of the general or of the ear, nose, and throat surgeon. Sometimes one of these cases in the initial stages presents itself as a case of neuralgic pain in the face, and there may be no clear localizing signs of growth. In this way I have seen early a few cases of nasopharyngeal growths, tumours of the bones of the base of the skull, and even antral growths invading the maxilla, though the obvious evidences of antral opacity in these latter should have been sufficient to side-track such patients from a neurologist.

It is not, however, of the early diagnosis of these difficult cases that I wish to write, but rather to draw attention to the terrible pain that many of these patients suffer in the later stages, perhaps after an excision of half the tongue or of the maxilla, or after treatment of a nasopharyngeal tumour by *x* rays, radium bomb, or radium needles. I have yet to see a nasopharyngeal malignant growth cured by surgical removal, and though radium treatment may cause temporary disappearance of the growth and great amelioration of the symptoms, yet recurrence after the lapse of a few months is the rule, and further treatment on the same lines is useless as the new growth now appears to be radium-fast.

When the surgeon in charge has decided that no further treatment can arrest the growth, it is then essential to render the remainder of the patient's life as bearable as

possible, and only too often analgesic tablets and finally morphine injections are considered the sole remedy.

It is in just these cases, where the malignant growth is invading the territory of the fifth cranial nerve, and where the growth has not spread into the neck or ear, that destruction of the Gasserian ganglion, and perhaps of the glosso-pharyngeal nerve also, may arrest the pain completely and give the patient comparative ease and comfort.

Illustrative Cases

From my case books I have picked out seven cases of malignant growth of the maxilla and antrum in which surgery failed to arrest either the growth or the pain, and in which alcohol injection of the Gasserian ganglion gave complete relief.

Case 1.—A woman aged 36 was sent to me by a surgeon in February, 1919, after he had removed the right maxilla for a malignant growth which had been causing severe constant pain for twelve months. As the pain was in no way lessened I injected the right Gasserian ganglion with alcohol by the lateral route, causing total trigeminal anaesthesia of all three divisions of the nerve. The pain was arrested at once, and ten days later the anaesthesia remained unaltered and there had been no return of pain.

Case 2.—A woman aged 65 had suffered for two years from pains in the left cheek shooting up the temple and across the cheek, and more or less constant. There was a perforating ulcer in the left palate posteriorly, and paresis of the left external rectus muscle. Hyperaesthesia to the scratch of a pin was noticeable over the whole left trigeminal area, though she stated that the left upper lip felt "rubbery." She was referred to me by an ear, nose, and throat surgeon in August, 1932, for alcohol injection, which I did, injecting the outer two-thirds of the Gasserian ganglion by the lateral route, with complete relief of the pain.

Case 3.—A man aged 70 was sent to me in November, 1933, by a surgeon for inoperable malignant growth of the right cheek and maxilla, causing intolerable shooting pains in the territory of the second division of the fifth nerve. The cheek was so scarred and tender that I used the lateral route in preference to the anterior for injecting the ganglion. It proved to be quite easy, taking only a few minutes to complete, and total trigeminal anaesthesia persisted. The neuralgic pains were at once completely relieved.

Case 4.—This patient, a man aged 52, was sent to me in June, 1936, by the same surgeon as in Case 2. He had complained for the past two months of severe pain in the left cheek, which was swollen and very tender. There was no anaesthesia of the face, though the skin was much mottled and atrophic on both sides following *x*-ray treatment for sycosis years before. Injection of the left Gasserian ganglion with 10 minims of 90 per cent. alcohol produced total trigeminal anaesthesia of all three divisions, with immediate cessation of the pain and tenderness.

Case 5.—A man aged 55 was seen in March, 1936, for pain affecting the whole of the left side of the head. For several months past he had had occasional bleeding from the nose, and neuralgic pain in the left side of the nose and across the cheek to the ear for three or four hours every afternoon. Turbinotomy gave no relief; another ear, nose, and throat surgeon found the left antrum opaque and removed a piece of growth, which was reported to be sarcoma. There was some numbness and partial anaesthesia of the left lower lip and half of the tongue, and also Eustachian deafness. The pain was controlled to a certain extent by taking sixteen veganin tablets daily. Alcohol injection of the outer two-thirds of the Gasserian ganglion was done by the lateral route on May 25, 1936, producing total anaesthesia of the left second and third trigeminal divisions, and immediate disappearance of all pain in the face.

Case 6.—In July, 1935, this patient, a man aged 59, complained of sore throat, and a piece of tonsil removed proved to be malignant. He was exposed to heavy radium treatment for 138 hours, and felt completely cured. Six months later the symptoms returned, and he was again similarly treated for fifty hours; in addition five radium needles were immediately afterwards inserted into the left tonsillar region for five days. Pain of a neuralgic shooting character started at once, and persisted continually afterwards in both left upper and lower jaws and side of the tongue, the pain spreading into the left ear and temporo-mandibular joint, with occasional intermissions. The jaws became fixed from contracture due to a radium burn close to the temporo-mandibular joint. It appeared to me that the acute onset of the pain immediately following the second heavy radium treatment was due to a trigeminal neuritis and probably glosso-pharyngeal neuritis, also secondary to the radium treatment. Left Gasserian injection, producing complete trigeminal anaesthesia, relieved the lower jaw pain, but neuralgia persisted from the ear to the maxilla and temple, probably glosso-pharyngeal in origin. This nerve was then dissected out behind the angle of the jaw and avulsed from its point of emergence from the base of the skull. Though his pain was relieved he unfortunately developed pyrexia and increasing weakness, dying three days later.

Case 7.—A man aged 73 had suffered from a chronic left antral discharge following an antral operation forty years previously. Severe pain in the left side of the face began in January, 1937, and when seen by an ear, nose, and throat surgeon a diagnosis of carcinoma was made. Deep *x*-ray therapy produced some improvement, though the pain was just as severe six months later. Radium needles were inserted, but the disease advanced, a large perforation in the palate being visible and the cheek being much swollen and discharging pus. The whole area of the cheek and jaw was intensely hypersensitive to touch. I saw him with his doctor on March 25 this year, and on the next day, under ethyl chloride anaesthesia, I injected his left Gasserian ganglion by the anterior route. Owing to the great swelling of the cheek the needle had to be inserted rather lower than usual, but no particular difficulty was encountered, and total trigeminal anaesthesia resulted. This persisted unaltered on the following day, when all the facial hyperaesthesia had disappeared, and the parts could then be handled with impunity.

These seven cases of malignant growth involving the antrum, maxilla, or tonsil illustrate the great relief to the pain that can be obtained by a well-placed alcohol injection in the Gasserian ganglion. No doubt the same relief could be secured by a sensory-root resection of the fifth nerve or by a trigeminal tractotomy, but owing to the severity of these open operations they will probably be generally held unjustifiable in view of the weak state of the patients and their short expectation of life.

Carcinoma of the tongue that is considered to be inoperable owing to spread of the disease in the floor of the mouth or from recurrence after operation or radium treatment also causes great suffering from pain in the face, which may be relieved by a less extensive injection than the type described above. Alcohol injection of the third trigeminal division at the foramen ovale will anaesthetize the area of the disease and give complete relief to the pain without pushing on the needle into the Gasserian ganglion. The anaesthesia of a well-placed injection should last as long as the patient's expectation of life.

Case 8.—In January, 1936, this patient, a woman aged 55, had been treated by radium needling for carcinoma of the tongue, but severe pain persisted along the left side of the mandible as far as the middle of the chin, and the tongue was very painful on moving. For the past twenty years she had complained of a "sore ear," being unable to sleep on that side, with pain around the ear following exposure to a draught. This I considered to be a "geniculate neuralgia" following a chill neuritis, though another neurologist who had seen her thought the pain was glosso-pharyngeal in origin and unsuitable for injection. However, alcohol injection of the foramen ovale ended her jaw and tongue pain completely, leaving

untouched the otic or geniculate neuralgia, to which she had become quite accustomed.

I have notes of three other cases of pain due to inoperable carcinoma of the tongue similarly treated by alcohol injection of the third trigeminal division, but their details are of no special interest.

Conclusion

I bring these cases forward to illustrate the great relief that it is possible to afford patients racked with the constant severe pain of inoperable growths in the tongue or jaws, by a treatment involving little or no shock, and one which can usually be done under local anaesthesia only.

RELATION OF HODGKIN'S DISEASE AND THE LEUKAEMIAS TO GASTRIC DISORDERS

BY

E. HARVEY, M.B., B.Ch., B.A.O.

Clinical Pathologist and Biochemist, Royal City of Dublin Hospital

Dr. Cramer's paper in the *Journal* of April 16, 1938 (p. 829), will, I hope and believe, prove a landmark in the history of our ideas with regard to the aetiology and treatment of at least certain forms of cancer. My observations, for whatever they are worth, entirely confirm all that he says with regard to gastric (and indeed intestinal) cancer. I have some reason also for thinking that Hodgkin's disease and the leukaemias may be diseases sequential to or coincidental with gastric derangement following on what Dr. Cramer aptly terms "insult to the gastric mucous membrane." I give a brief summary of five case histories.

Case I

In August, 1936, a casual labourer aged 32 was admitted to hospital complaining of severe vomiting coming on after every meal, with abdominal pain, rapid loss of weight, thirst, and diarrhoea. He had very much enlarged cervical glands and enlargement of glands in the left axilla, with a clean smooth tongue. His medical history told of removal of the appendix somewhat over a year previously. He proved to be a typical case of Hodgkin's disease. Examination of his blood showed: haemoglobin, 95 per cent.; red cells, 5,475,000 per c.mm.; white cells, 7,800 per c.mm.; neutrophil polymorphs, 57 per cent.; eosinophil polymorphs, 1 per cent.; lymphocytes, 42 per cent. His usual diet was stated to be: Breakfast—white bread and butter, very strong tea, sometimes an egg or bacon; dinner—stewed beef and potatoes, white bread and butter, very strong tea; evening meal—white bread and butter, very strong tea; supper—a repetition of the evening meal. Curiosity was evoked by this dietetic history, and a test meal was given. It showed the absence of free hydrochloric acid in all specimens. As a consequence of this finding it was thought worth while to try the effect of injections of campolon, in addition to the hospital dietary and deep *x*-ray treatment of the enlarged glands. How far the campolon helped him is only conjectural, but he improved much in his general condition, with loss of pain and vomiting, increase of weight, etc., so that eventually he left the hospital on the understanding that he would come weekly for inspection to the out-patient dispensary. His subsequent history, however, was that of sudden serious relapse necessitating immediate removal to another hospital, where, I fear, death ensued quickly.

Case II

A carpenter aged 37 was admitted to hospital in August, 1937, complaining of loss of weight and strength, with quick fatigability and frontal headaches following on an attack of influenza six months previously. There were also intermittent pains in the back and legs, with profuse perspiration at times, a tendency to constipation, and great distension after meals. He had a jaundiced colour, which he stated had been constant for five years previous to admission. The glands in the left cervical and right and left inguinal regions were greatly enlarged: the patient had first noticed them two months previously.

There was a previous medical history of measles, whooping-cough, and tonsillectomy. He had been "pernickety" regarding food all his life, with little appetite for dinner but a good appetite for breakfast and the evening meal. He was very fond of strong tea, had indulged heavily in whisky, and had some addiction to stout and the moderate use of tobacco. The urine for some time after admission was ammoniacal and was positive to Ehrlich's urobilinogen test. Blood examination showed: haemoglobin, 74 per cent.; red cells, 2,900,000 per c.mm.; white cells, 3,400 per c.mm.; polymorphs, 52 per cent.; lymphocytes, 48 per cent. Anisocytosis was somewhat marked. This would indicate pernicious anaemia, while the glandular condition was one of Hodgkin's disease. A test meal showed free hydrochloric acid and total acid within fairly normal limits. The patient was put on campolon and colliron, with deep *x*-ray therapy over the enlarged glands. He responded poorly to treatment. One month after admission examination of his blood showed: haemoglobin, 59 per cent.; red cells, 2,350,000 per c.mm.; white cells, 5,100 per c.mm.; polymorphs, 63 per cent.; lymphocytes, 37 per cent.; and megalocytosis. Later he sank rapidly and died.

Case III

In February, 1938, a signalman aged 59 was admitted to hospital complaining of a very large "lump" in the abdomen which was incapacitating him from work. On examination the "lump" was seen to be an enormously enlarged spleen extending well to the right of the umbilicus and down to the inguinal ligament. The liver was also enlarged about two fingerbreadths below the costal margin in the mammary line.

A blood examination on February 4 showed: haemoglobin, 69 per cent.; red cells, 3,320,000 per c.mm.; white cells, 214,000 per c.mm.; polymorphs, 3 per cent.; premyelocytes, 97 per cent.; slight anisocytosis and poikilocytosis. The diagnosis of myelogenous leukaemia was made. On inquiry a history of daily vomiting before breakfast for eight to nine years previously was elicited. His diet had been: breakfast—4 to 5 oz. of white soda bread, a plain boiled egg, two cups of strong tea with two drachms of sugar to each cup; 10 to 11 a.m.—4 to 5 oz. of white soda bread, one cup of strong tea with two drachms of sugar; dinner, 2 p.m.—potatoes boiled in jackets, fried steak up to 8 oz., cabbage or turnips cooked with soda, one cup of strong tea with two drachms of sugar; evening meal, 4 to 5 p.m.—same as for breakfast, omitting the egg. Occasionally oatmeal porridge with milk was taken for breakfast. No alcohol was drunk, but 1½ oz. of tobacco was smoked weekly. The history of vomiting, and the very avitaminous diet, with the strong tea superadded so constantly, led to a test meal being given. It showed no free hydrochloric acid in any specimen. The patient received hospital diet with deep *x*-ray treatment over the enlarged spleen. His white cell count decreased rapidly, and on March 30 a blood examination showed: haemoglobin, 85 per cent.; red cells, 4,700,000 per c.mm.; white cells, 4,500; neutrophil polymorphs, 22 per cent.; eosinophil polymorphs, 2 per cent.; premyelocytes, 76 per cent.; red cells, regular.

On April 7 a further test meal was given. Again there was no free hydrochloric acid in any specimen. Parallel to the decrease in the white blood cell count was the rapid