TABLE II.—*Test Cases*

Case No.	Sex and Age in Years	Home Conditions	Patient's Condition	Vitamin B ₁	Course of Disease	Result
1	F. 6	Very poor	Very severe	40 mg. from 7th day	Very satisfactory	Recovered
2	M. 11	"	Severe	110 mg. from 9th day	Palatal and pharyngeal paralysis. Right Bell's palsy and paralysis of legs	"
3	M. 8	Fair	Very severe	80 mg. from 23rd day	Very satisfactory	"
4	M. 6	Very poor	Severe	60 mg. from 30th day	Fairly satisfactory	"
5	F. 6	Poor	"	36 mg. from 15th day	Very satisfactory	"
6	M. 6	Fairly good	"	56 mg. from 5th day	Palatal paralysis on 10th day. Pharyngeal paralysis in 5th week	"
7	M. 4	Good	"	65 mg. from 26th day	Palatal paralysis 15th day. Gallop rhythm of heart. Pharyngeal paralysis. Diaphragmatic paralysis	Died in iron lung
8	M. 2	Poor	"	34 mg. from 12th day	Very satisfactory	Recovered
9	M. 9	Fairly good	"	55 mg. from 48th day	Palatal paralysis on 43rd day. Late heart failure 48th day	"
10	M. 9	"	Very severe	52.5 mg. from 16th day	Palatal paralysis 32nd day	"
11	F. 19	Fair	"	60 mg. from 8th day	Satisfactory	"
12	M. 10	Good	"	60 mg. from 26th day	Palatal paralysis 5th day. Early heart failure 16th day	"
13	M. 10	Poor	"	121 mg. from 3rd day	Very satisfactory	"
14	M. 10	Good	Severe	152 mg. from 8th day	Heart developed a mitral systolic murmur 14th day. No heart failure	"
15	M. 14	"	Very severe	126 mg. from 2nd day	Palatal paralysis 22nd day	"
16	F. 8	Fair	Severe	135 mg. from 9th day	Satisfactory	"
17	F. 8	Good	"	100 mg. from 11th day	Very satisfactory	"
18	F. 13	Poor	"	140 mg. from 5th day	"	"
19	M. 10	"	"	162 mg. from 3rd day	"	"
20	M. 4½	Fair	"	45 mg. from 10th day	"	"

TABLE III.—*Control Cases*

Case No.	Sex and Age in Years	Home Conditions	Patient's Condition	Course of Disease	Result
1	M. 3	Fairly good	Very severe	Palatal paralysis on 14th day. General condition fair	Recovered
2	M. 7	Good	"	Palatal and pharyngeal paralysis. Paralysis of neck and legs. Late heart failure	"
3	M. 6½	Poor	"	Very satisfactory	"
4	M. 7	Very poor	Severe	Fairly satisfactory	"
5	F. 8	Poor	"	Very satisfactory	"
6	M. 7	Very poor	"	Palatal paralysis 22nd day	"
7	F. 2	Good	"	Very satisfactory	"
8	M.	Fairly good	"	Secondary streptococcal abscess. Satisfactory	"
9	M. 7	"	"	Pulse irregular	"
10	F. 15	Poor	Very severe	Bradycardia on 25th day	"
11	M. 16½	Fair	"	Satisfactory	"
12	F. 3	Good	"	Palatal paralysis 12th day. Abortive pharyngeal paralysis 47th day	"
13	M. 8	Poor	"	Very satisfactory	"
14	M. 16	Good	Severe	Satisfactory	"
15	M. 10	"	Very severe	Right strabismus 12th day	"
16	F. 8	Fair	Severe	Satisfactory	"
17	F. 13	Good	"	"	"
18	F. 8	Poor	"	"	"
19	M. 6	Fair	"	Very satisfactory	"
20	M. 5	Poor	"	Satisfactory	"

Conclusions

The impression gained from the series was that vitamin B₁ had neither a prophylactic nor a therapeutic effect on diphtheritic paralysis or the cardiovascular complications of diphtheria. The most that could be claimed was that it seemed to give the patients a sense of well-being, plus

an improvement in appetite. The sense of well-being was of doubtful value in those who were acutely ill as it tended to encourage restlessness. Vitamin B₁ helped in the convalescent stage.

Summary

Most of the published cases of diphtheria in which vitamin B₁ has been used are given in tabular form.

The action of vitamin B₁ was investigated in 20 diphtheritic cases of our own and the results checked by 20 control cases. The results are presented in tabular form.

Thanks are due to Messrs. Evans Sons Lescher and Webb Ltd. for help and generous supplies of vitamin B₁.

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TREATMENT OF GINGIVITIS WITH ASCORBIC ACID

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At the Dundee Dental Hospital, during ten weeks recently, 18 out of a total of 505 new patients have been found to be suffering from gingivitis: 14 of these have been treated by us with massive doses of ascorbic acid with favourable results; 4 failed to co-operate.

The clinical features in a typical case are as follows. The patient complains of painful and bleeding gums. The bleeding is usually spontaneous, but is worse when the teeth are brushed. In 10 cases there was marked lassitude. On examination the gums are found to be red and congested. The area involved varies, but in most cases it extends from the gum margin upwards or downwards for a distance of 8 to 10 mm. On pressure the gums bleed readily, the blood flowing freely from the gum margin. In 2 cases severe sloughing of the gum was observed. In spite of the varied types of gingivitis described in the textbooks we have taken as our main criterion of this condition the prompt bleeding of the gum on pressure. This sign is of great value, as it provides a ready means of following the reparative process. In no case could the gingivitis be attributed to trauma, calculus, or the administration of drugs. There were no other gross signs of a pre-scorbutic state.

Treatment

No dental treatment, such as scaling or the use of mouth-washes, was undertaken in any of our cases. On admission the patient is given 300 mg. of ascorbic acid, and a sample of urine is collected approximately six hours,

or at the latest twelve hours, after this dose. The urine is tested for ascorbic acid by the dichlorophenol-indophenol indicator (Roche). This method follows the saturation test of Harris and Ray (1935). It readily enables one to determine the ascorbic acid saturation of the patient. The presence of 5 mg. or more of ascorbic acid per 100 ml. of urine is taken to indicate adequate saturation.

The patient returns for inspection the following day, when a further 300 mg. of ascorbic acid is given. The urine passed after this dose is then tested. Even after one such dose a great difference in the gum tissue can be observed. The pain has largely disappeared, and the red and congested area of gum has shrunk to half the original size. The gums still bleed on pressure. During the first and second days of treatment some patients experience a tingling sensation in the gums. This is probably associated with the reparative process. The treatment is continued for a further four days, or for two days longer than the time it takes to increase the amount of ascorbic acid in the urine to a value of 5 mg. per 100 ml. The amount of ascorbic acid found necessary to saturate the patients has varied from 900 to 4,200 mg. The average dose has been 2,000 mg.

In most cases there is no bleeding from the gums on pressure after four days' treatment. The long-standing cases appear to be more refractory. One patient who had suffered from marginal gingivitis for four years required 4,200 mg. before his gums responded satisfactorily. The statement that no bleeding occurs on pressure must be qualified to some extent, however, by remarking that even after the gum has returned to its normal healthy consistency firm pressure will still provoke some bleeding from the interdental papilla between teeth 2 and 3 (lateral incisors and canines). For some unexplained reason this area heals slowly. It may be that this persistent bleeding is associated with lack of a factor that is capable of restoring capillary permeability to normal. Szent-Györgyi claims that the haemorrhagic lesions in scurvy are in part due to absence of vitamin P (hesperidin). Patients have all volunteered the information that they feel much better in general health, and their appearance certainly bears this out. When the patients are fully saturated and their gums are in good condition they are given a maintenance dose of 100 mg. a day. They return for inspection each week.

During the course of treatment by ascorbic acid no dental treatment whatever is given. We did not adopt the customary procedure of scaling or application of mouth-washes, etc., as we wished to confine our observations to the action of ascorbic acid alone. It is interesting to remark that in 7 cases the state of oral hygiene and of the teeth was very bad indeed.

The results would apparently indicate that lack of ascorbic acid is one important factor in the causation of such cases of gingivitis. The large amounts necessary to saturate the patients are very striking. The disappearance of the lesion with continued administration of the vitamin must be more than purely fortuitous. As long ago as 1930 Hanke advocated the use of massive doses of orange juice in the treatment of gingivitis. He recommended one pint of orange juice daily for long periods—up to a year at least. This amount of orange juice contains approximately 300 mg. of ascorbic acid and possibly other compounds. He attributed his excellent results to the presence of vitamin C. Roff and Glazebrook (1940) have also obtained successful results. They state, however, that marginal gingivitis can be cured by better oral hygiene. Other workers who have reported favourable results of ascorbic acid in the treatment of gingivitis are Kramer (1937), Demoulin (1938), and Herlitz (1939).

Summary

Fourteen cases of gingivitis have been treated with massive doses of ascorbic acid without any other dental treatment such as scaling or mouth-washes. 300 mg. of ascorbic acid was given daily until a urine test showed that the patient was saturated with the vitamin. On an average a total of 2,000 mg. was needed. The previously sore and inflamed gums became normal after approximately four days' treatment. The treatment should be followed by a maintenance dose.

We are indebted to Roche Products Ltd. for our supply of ascorbic acid and indicator tablets.

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Clinical Memoranda

Chlorine for Nitric Acid Burns

Burns caused by the strongly corrosive acids, nitric and sulphuric, differ in many ways from heat burns. In the latter the object causing the burn ceases to act when the body is removed from contact, but in chemical burns the destruction of tissue goes on until the corrosive is absorbed, washed out, or neutralized.

Clinically there is a contrast between the types, for the heat burn will show inflammatory reaction within twenty-four hours, while the nitric acid burn may appear unchanged for seven to ten days, giving to the uninitiated a false hope that little damage has been inflicted. During this quiet period the skin in the burnt area retains the deep yellow stain (xantho-proteic reaction) which is formed immediately on contact with strong nitric acid, and it feels leathery, but is neither cold nor the seat of pain. Sensation may be slightly numbed, but neither in finger nor limb, should the burn involve these parts, will there be interference with voluntary movement. At the end of a week, or slightly later, a line of demarcation appears, and necrosis becomes evident, progressing to a slough which separates tediously. Healing is remarkably slow. When extensive areas in the back or hip are burnt, prolonged residence in hospital becomes necessary, and cases have been met with for which nine months of indoor treatment have been required before a succession of skin grafts have brought the patient to the stage of being discharged. In the area of the knee-joint deep necrosis from a nitric acid burn has destroyed the continuity of the peroneal nerve and caused permanent drop-foot. On the cheeks the contraction following the healing of nitric acid burns sometimes gives rise to cicatricial ectropion, calling for plastic surgery.

In view of these facts, which are well known, any treatment which promises to lessen the severity of the corrosive action of nitric acid on the skin is worth recording, and for this reason the following case is reported.

CASE REPORT

A workman was turning an earthenware cock when it sprang from its seating and a quantity of strong acid was splashed with force on to his face. The acid had the following composition: nitric acid, 23.5%; sulphuric acid, 68.8%; water, 7.7%. He immediately immersed his face in the nearby water-butt and continued lavage until he was brought by ambulance to the ward. There the routine treatment of scrubbing the stained areas with methylated spirit and profuse bicarbonate of soda was given. The parts affected were the forehead, almost all of the left cheek, the bridge and left side of the nose, the chin, and scattered areas over the neck. The eyes had been protected by goggles. The intensity of the yellow stain recalled a case ending in cicatricial ectropion. The site of the burn was in both cases similar, as was also the strength of the acid involved. The idea that decolorizing the