Conclusion

Previous writers have concluded that epidemic nausea and vomiting is an upper respiratory infection with an incubation period of from two to seven days, probably due to an unknown virus. The present outbreak strengthened the impression that the disease is communicable and that the portal of entry is the upper respiratory passages. The incubation period was probably within the range of from two to seven days, but could not be determined accurately. Infection *ex alimentatione* immediately preceding the attack was excluded with some confidence by the circumstances. An alimentary vehicle consumed a few days before the appearance of symptoms could not be excluded, but as a cause was thought to be improbable.

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TWO CASES OF RUBELLA MENINGO-ENCEPHALITIS

BY

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The occurrence of meningo-encephalitis in association with rubella is exceedingly rare. Taylor (1937), in his account of meningo-encephalitis following German measles, states that only 12 other cases had been reported up to that date.

Case I

A Naval Air Arm observer aged 19 was admitted to the zymotic ward on June 2, 1942, with the diagnosis of meningitis. His communication sheet stated that on May 29 he reported to the sick bay at his own depot with a typical rubelliform rash, cervical adenitis, and slight general malaise. There had been an epidemic of rubella in this establishment immediately prior to this date. He was diagnosed and treated accordingly. On June 1 he complained of severe frontal headache. His temperature was normal. The duty medical officer noticed that the right pupil was larger than the left. No other abnormal signs were reported. Next day the headache was worse; temperature 100°; pulse 80; tongue heavily furred; severe pain on flexion of neck, and weakly positive Kernig's sign present both sides; pupils equal and reacting sluggishly to light.

June 2.—On admission he lay curled up in bed, face towards the wall and away from the light. He was mildly annoyed at being disturbed for examination, and somewhat drowsy, but with intelligent and co-operative. Some exposure phobia was evident, as is commonly found in meningitic cases. He was obviously feeling ill: face pale, tongue furred, and remains of what might have been a rubelliform rash over his trunk, most pronounced on the back. Temperature 100.8°. Glands in posterior angle of neck enlarged and tender. No Koplik's spots seen on buccal mucous membrane. Pupils equal in size; reactions brisk. All reflexes normal. Babinski's sign absent. Kernig's sign negative. Marked nuchal rigidity with pain on flexion. Heart, lungs, and abdomen normal. Lumbar puncture was performed and 16 c.cm. of clear fluid withdrawn under increased pressure (Table I). Sulphapyridine was administered as a routine measure in view of the possibility of meningococcal meningitis, several cases of which had recently been in the ward.

June 3.—Condition much the same. Temperature 100°. Kernig's sign positive; marked neck rigidity. Knee-jerks rather brisk. Doubtful plantar response.

June 5.—Neck rigidity less severe. Flexor plantar response. Knee-jerks normal. Kernig's sign negative. Pyrexial still. Lumbar puncture repeated: 20 c.cm. of clear yellow fluid withdrawn under increased pressure.

June 6.—Temperature 99°. Condition improved. Complained of slight cough. A few crepitations heard at left base.

June 8.—Temperature rising. No clinical change.

June 12.—A general marked rubelliform rash again present over trunk and proximal part of limbs, pink and papular in nature, typical of rubella. A few spots also present on face. No Koplik's spots seen. Tender cervical adenitis present. Temperature 100°. C.N.S. normal. Lumbar puncture performed: 15 c.cm. of clear fluid obtained, not under pressure.

June 14.—Rash completely gone. No skin staining left. No symptoms beyond slight headache. C.N.S. normal.

The patient made an uneventful recovery from this date and went through his period of convalescence without the appearance of sequelae.

TABLE I.—Results of C.S.F. Examination in Case I

Date	Protein (mg./100 c.cm.)	Cells per c.mm.	Lymphocytes	Polymorphs	Sugar (mg./100 c.cm.)	Chlorides (mg./100 c.cm.)	Organisms	Red blood cells	Fibrin	Range Gold Curve
2/6/42	160 Glob. +	3	—	—	—	730	Nil T.B. not found	—	—	4444322110
5/6/42	100 Glob. +	20	94%	6%	60	720	Nil	+	+	3444553100
10/6/42	50	50	96%	4%	30.3	730	Nil	—	—	0012332210

Wassermann reaction negative

In view of the typical nature of the rash in this case, together with the fact of the rubella epidemic in progress, the diagnosis of rubella must be considered as confirmed. The occurrence of a second rubelliform rash is difficult to explain unless it be considered as a relapse, which, although rare in rubella, is not unknown. The C.S.F. findings are interesting in view of the marked increase of protein, especially with regard to its dissociation from the cell count. A similar dissociation is found in cerebral arteriosclerosis, some cranial tumours, and spinal tumours. This point in common with arteriosclerosis is worthy of comment in so far as Taylor (1937), describing a case of encephalomyelitis which came to the post-mortem table, mentions the extreme degree of arterial degenerative proliferation found in the brain together with perivascular cuffing of small lymphocytes with occasional large ones. The red blood cells and the minute fibrin clot found in the second specimen of C.S.F. were probably an artefact due to the previous lumbar puncture.

Another case of rubella which portrayed the signs and symptoms of encephalitis is included in the records of this hospital for the year 1940.

Case II

Feb. 5, 1940.—During a large epidemic of rubella a rating aged 18 was admitted with the typical rash, cervical adenitis, and sore throat. No Koplik's spots were seen, and there were few signs of respiratory catarrh or conjunctivitis. We had 200 cases of rubella in the hospital at this time.

Feb. 10.—The patient, who had been progressing normally apart from a mild degree of pharyngitis, vomited a greenish fluid several times and had a small epistaxis. He complained of headache. Temperature rose to 101.2°. He was tender in the right hypochondrium and was thought to have gastritis. A slight cough was present.

Feb. 12.—Patient vomited again. He was found to be extremely listless, drowsy, and emotionally unstable. Was easily tired and unable to concentrate on any one thing except for a very short time. Articulation was poor, with a tendency to mumble. No physical abnormality was detected. Blood urea 36.5 mg., sugar 104.6 mg. per 100 c.cm.

Feb. 14.—Still vomiting. Very ataxic. Could barely stand even with feet well apart. Marked emotional instability present. Right pupil larger than left: reactions normal. Optic disks showed faint blurring of edges. Other cranial nerves intact. Investigation of the C.N.S. showed impaired muscle sense when tested by movements of feet or fingers. Finger-nose test especially bad, the finger alighting well up the forehead. Kernig's sign negative. Remainder of C.N.S. normal. No neck rigidity. The *status quo* was preserved during the next 9 days, with slight improvement.

Feb. 23.—Lumbar puncture performed (Table II). Now apyrexial, and remained so throughout rest of illness and convalescence.

Feb. 25.—Considerable vomiting, projectile in nature, without nausea and preceded by bouts of severe headache. C.N.S. completely normal.

Feb. 27.—Lumbar puncture performed and 8 c.cm. of clear fluid withdrawn, not under pressure.

From this date the patient's condition improved rapidly; the vomiting ceased, headache disappeared, and the central nervous signs remained normal. A further lumbar puncture was performed on March 12, 1940. There were no abnormal characteristics about this fluid, and, since the patient was by now completely recovered, he was sent to a convalescent home and thence on sick leave. There were no noticeable sequelae.

TABLE II.—C.S.F. Results in Case II

Date	Protein (mg./100 c.cm.)	Cells per c.mm.	Lymphocytes	Sugar (mg./100 c.cm.)	Chlorides (mg./100 c.cm.)	Organisms	Lange Gold Curve
23/2/40	70	20	++	40	710	Nil T.B. not found	0022221000
27/2/40	40	8	++	—	—	Nil	0011000000

Wassermann reaction negative

The diagnosis of rubella, as in Case I, does not seem open to reasonable doubt. Meningism was not present at any stage, and the central nervous signs and symptoms were those of an encephalitis with resulting increase in cerebral pressure.

Commentary

Complications of any variety during an attack of rubella are very rare, and involvement of the central nervous system is the least common of these. The cases of this type so far reported include manifestations of meningitis, encephalomyelitis, polyneuritis, and ascending paralysis of the Landry variety. At least two of these cases were fatal.

The necropsy on the 18-year-old girl described by Taylor (1937) revealed the typical picture of an acute to subacute encephalomyelitis with demyelination most pronounced in the perivascular regions, as may be found in encephalitis associated with the exanthemata, such as measles, small-pox, and mumps. According to Russell Brain (1940) the cause of this type of encephalitis is still unknown. The former view that it is due to the virus of the exanthem in question is in disfavour owing to failure to reproduce experimentally the pathological picture by means of the virus. An alternative opinion, that the condition is brought about by another virus common to all patients and normally latent but activated by the exanthem, would explain the similarity of pathological features in all cases and also the fact that encephalitis of this nature may arise with apparent spontaneity unpreceded by an infection. No such virus has, however, so far been demonstrated. Finley (1937) suggests that the encephalitis may be an allergic reaction in the brain following the general eruption. This is in accordance with the finding of Rivers and Schwentker (1935) that a demyelinating encephalomyelitis could be produced in monkeys by repeated injection of brain material.

I am grateful to Surg. Cmdr. Mussen, R.N., for bringing Case II to my notice, and for his advice in the compilation of this account; also to Surg. Rear-Admiral Bradbury, R.N., and Surg. Capt. Parker, R.N., for permission to publish it.

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In a discussion on bacteriaemic staphylococcal infection, Champ Lyons (*Surg. Gynec. Obstet.*, 1942, 74, 41) observes that the importance of thrombophlebitis in the production of metastatic abscesses was recognized by John Hunter. He quotes Topley to the effect that in a bacteriaemic staphylococcal infection "the cocci are carried from the original focus of infection in detached fragments of an infected thrombus." Lyons presents evidence in support of this view, and believes that pulmonary thrombophlebitis as a factor in the perpetuation of a staphylococcal bacteraemia may be likened to a left-sided endocarditis.

PLANNING FOR THE TREATMENT OF HEAD INJURIES*

BY

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The war has given impetus to the study of head injuries, and information is now available which should assist in the formulation of plans for post-war medical services.

I. Plans should be based on a Survey of Unselected Material

Before the war, with few notable exceptions, specialists responsible for teaching on head injuries saw an undue proportion of the severe cases and those in which compensation or litigation was pending. Although as long ago as 1932 Ritchie Russell had shown that the majority of patients with head injury made a satisfactory return to work within six months, treatment and prognosis of head injuries continued for the most part to be governed by pathological doctrines which implied, or were thought to imply, that bruising of the brain was an almost invariable accompaniment of even minor concussion, and that the bruising took a long time to resolve and might continue to produce symptoms for a number of years. Patients are still encountered who have been confined to bed for weeks or months after relatively trivial head injuries, and have been warned that because of brain damage they cannot expect to resume full normal activity for periods of months or a year.

There is still considerable controversy about the pathological processes in head injury, but in the special centres established since the outbreak of war comprehensive survey of head injuries is accumulating an impressive number of facts which show that the picture of the late results of blunt head injury† has been painted blacker than it really is. Thus, in a military hospital for head injuries, in a series of 237 acute cases of head injury in the fighting Services (not including fatal cases, but otherwise unselected), Symonds and Ritchie Russell (1943) found that 80% were successfully returned to duty, the majority within three months. Among civilians Eric Guttman (1943) obtained similar results in a consecutive series of 158 wage-earners admitted to the Radcliffe Infirmary, Oxford, suffering from head injury: 25% returned to work within three weeks, 50% in between three and nine weeks, and only 8 patients had not returned to work within six months. In Guttman's series there had been an initial hospital mortality of 4%.

These are the results in unselected hospital material from a mixed urban and rural area, at a time of "comparatively standardized and favourable social conditions, when everybody has the choice of well-paid jobs and most employers are ready to facilitate gradual return to work." In civilian head injuries, permanently incapacitating brain damage appears to be an uncommon event—among Guttman's 158 wage-earners there were only 2 patients so affected—and early return to work may be expected in the majority. The results suggest the need for revision of teaching on the subject of head injuries. They also suggest that where problems of compensation arise settlement should be made at an earlier date than has been customary in the past.

II. Where should Head Injury Patients be Treated?

Accident cases are usually taken to the nearest hospital, and it would be difficult to devise machinery for primary segregation of head cases in special centres. Guttman found that 30% of his head-injury patients had major injuries in other parts of the body, such as fractures of long bones, and this fact favours the current practice of sending all accidents to the general hospital. There is little doubt, however, that, in the general hospital, accident cases should be segregated in an accident service, as has been done at Birmingham and Oxford, under the care of surgeons who particularize in accident work and who have special facilities for resuscitation.

Since the majority of head injuries are evidently mild and, when treated correctly, uncomplicated, it would be reasonable

* Based on a paper read to a meeting of consultants of the combined Services at Reading, Nov. 28, 1942.

† Gunshot wounds of the head are not considered in this paper. They constitute a separate problem.