In this case the haemolytic process seems to be due to overactivity of the normal mechanisms for the removal of red cells from the blood stream. The nature of such mechanisms is at present obscure. It is known, however, that they are influenced by the sex hormones. Hyperhaemolysis has been demonstrated in normal women during the latter part of the menstrual cycle (Ashby, 1921; Berlin, 1951). These authors, while admitting the obscurity of the nature of this hyperhaemolysis, conclude that it is due to hormone influences; Berlin also believes that the spleen plays no part in its production, as he found it to persist after splenectomy. Presumably, during a normal pregnancy the hyperhaemolysis is inhibited, to prevent the increased concentration of sex hormones following gestation from causing a haemolytic anaemia. In our case the inhibitory mechanisms would appear to have failed.

Summary

A case of symptomatic haemolytic anaemia associated with pregnancy is described. The haemolytic process occurred during a young woman's first two pregnancies and ceased spontaneously on both occasions during the puerperium. Neither circulating haemolysins nor atypical agglutinins were demonstrated. The mechanism of the hyperhaemolysis was obscure. We suggest that it may be related to that occurring during the pre-gestational phase of the normal menstrual cycle.

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ROSEOLA INFANTUM

13 CASES SEEN IN GENERAL PRACTICE

BY

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Very little has been published in Britain on this relatively common condition, also known as exanthem subitum or sixth disease. The *British Medical Journal* (1950) draws attention to this "common but little-known infectious disease of young children which has received too little attention in the past."

Nearly all the published accounts of the disease come from the U.S.A., where Zahorsky, of St. Louis, first described it as a clinical entity and gave it the descriptive name in 1910. Up to 1940 he had seen about 300 cases in private practice (Zahorsky, 1940). Cases have been reported from all over the world, including Brazil, Formosa (Itagaki, 1933), Canada, Germany (Fischhof, 1936), South Africa (Witkin, 1937), Sweden, and Australia (Jackson, 1949). In Britain, only Schlesinger (1937) refers to a few cases seen in London.

The purpose of this paper is to show that, despite the paucity of references to it in the journals and textbooks, it arises quite frequently in general practice.

Age Incidence.—The disease affects infants between the ages of 6 months and 2 years. The youngest in Clemens's (1945) series of 80 cases was 5 months old, but he quotes one 2 months old. My youngest patient was 4½ weeks old.

Older children and adults have been involved in other series. The sexes are equally affected.

Aetiology.—Although the infective nature of the disease was accepted, proof was not established until Kempe *et al.* (1950) succeeded in transmitting the disease by injecting serum from an 18-months-old child in the pre-eruptive stage into a 6-months-old susceptible baby kept in isolation, who developed typical roseola infantum on the ninth day. In young apes these workers produced a fever without a rash after a similar period. While they consider the causal agent to be a virus, they have been unable to isolate it or to transmit it through any of the usual media. Hellström and Valquist (1951), at Upsala, have confirmed these findings in a larger series of 14 human cases.

Epidemiology.—Although most cases arise sporadically, epidemics have been reported, and the cases which I noted in my practice presented as a mild epidemic, although I can identify in recollection a number of sporadic cases over the years. American writers believe that it is endemic and almost universal in infancy, but that in favourable circumstances it appears in epidemic form. They find that the highest incidence is in the spring and to a less degree in the autumn.

Pathology.—No deaths have been reported. The blood changes seem to be important—they are a neutrophil leucopenia, appearing during the febrile stage and falling to a total white-cell count as low as 2,000 per c.mm. This process is reversed as soon as the rash appears, and the count returns to normal within a week. The incubation period is 5 to 15 days.

Clinical Course

The individual case presents on the following lines. A call is received to an infant who "has come out in a rash all over. He's been feverish for a few days, and I nearly sent for you yesterday, doctor. When I saw the rash to-day I thought it must be measles, but he seems better now." In fact, the child appears well apart from a rash in the form of discrete rose-coloured macules, most marked on the trunk but spreading on to the thighs and upper arms, up to the neck and often behind the ears. In severe rashes some coalescence may occur.

If the case is seen earlier the child has a fever extending over three to five days, the temperature rising to 101–102° F. (38.3–38.9° C.) or higher, with symptoms of inflammation and congestion of the nose and throat, and frequently of the tympanic membranes. He is restless, may refuse feeds, and is obviously unwell. Examination of the fauces shows redness of the tonsils and pharynx, and of one or both ear-drums. A cough may be present without signs in the chest. With the appearance of the rash the child rapidly improves, the catarrhal signs disappear, and normal lustre returns to the ear-drums. Posterior cervical and occipital lymph-node enlargement can nearly always be found: in my experience this is more obvious when the rash is severe, especially on the neck and behind the ears. The glands in the groins and armpits do not become palpable. All signs disappear in a day or two in most cases, but occasionally congestion of the nose or Eustachian tubes persists and frank otitis media may develop (as in one of the present series).

Clemens (1945), in a series of 80 cases, reports a pre-eruptive enanthem in 87%: this took the form of erythematous specks and streaks on the soft palate which preceded the typical exanthem by 48 hours and coincided with the period of maximum tubotympanitis and faucial congestion. I noted this in one case, but would be inclined to dismiss it as part of the general congestion of the mucous membrane of the palate.

Differential Diagnosis

In a clear-cut case the disease which is most like roseola infantum is rubella. In that condition the pyrexia and malaise coincide with the rash and are usually less pronounced. There is not the three to five days' pre-eruptive

fever and malaise, with a dramatic return to normality invariably found with roseola. In rubella the rash is usually marked on the face, as opposed to roseola infantum, in which the face escapes, apart from a few faint rosy macules on the forehead. The absence of cases of rubella among older children and adults suggests the correct diagnosis.

Scarlet fever may be suspected. The absence of circum-oral pallor, strawberry tongue, tonsillar adenitis, and the rapid resolution of the rash in roseola infantum, together with the age incidence, will help to exclude it.

The prodromal rash of measles, or the early stage of the eruption with a post-auricular rash, may also be suggested. Again, this doubt is soon resolved by the absence of Koplik's spots and the course of the illness.

Since I have recognized the disease in practice I am certain that many rashes which were previously dismissed to the parents as "teething" or "stomach upset" or "drug rash" have in fact been roseola. The story of restlessness, fever, and sweating may suggest miliaria, but the rash is quite different. There are, too, the blood changes I have already mentioned.

Complications

Although most observers say that recovery is always complete, Zahorsky reports several cases of suppurative otitis media and rhinitis following the illness, and one case in the present series developed an acute catarrhal otitis media three days after defervescence.

Jackson (1949), in Australia, had two cases in which convulsions occurred in the feverish stage: no changes were found in the C.S.F., and he believes them to have been due to the pyrexia.

It has been suggested that deaths in convulsions may occur before the rash has had time to appear; this is obviously difficult to prove.

Details of Cases

Case	Age in Years	Sex	Date of Rash	Comments
1	3½	M	15/1/54	Cough and cold preceding; cleared rapidly afterwards. Post-auricular glands enlarged
2	10/12	M	23/1/54	Feverish preceding rash—normal afterwards. Lives in adjoining street to Case 1
3	10/12	F	23/1/54	Feverish preceding rash—normal afterwards
4	10/12	F	23/1/54	Typical roseola—had been to same Christmas party as Case 3, on 16/1/54
5	11/12	M	27/1/54	Had tonsillitis 10 days previously—apparent recurrence 3–4 days before rash, but subsided with rash
6	4½/52	F	27/1/54	Adopted sister of Case 1. Cough and nasal catarrh. ? Pain on swallowing; fauces red. Better after eruption
7	11/12	F	4/2/54	Fever preceding—no cough or cold. Better after rash
8	11/12	M	15/2/54	Fever and tonsillar infection preceding eruption. Fine macular rash with some coalescence. Occipital glands enlarged. Brother aged 4 years remained well
9	19/12	M	17/3/54	Rash to-day after 4 days' malaise. Now well
10	23/12	M	21/3/54	Feverish beforehand. Both T.M. very red. Ear infection seemed to be settling when seen again 2 days after rash, but flared up as typical acute catarrhal otitis media after another 48 hours
11	12/12	F	26/3/54	Typical rash with preceding fever
12	4/12	M	27/4/54	
13	9/12	F	25/8/54	Typical rash on trunk—preceded by fretfulness and diarrhoea, which stopped when rash appeared

Present Series

In the brief description of individual cases which follows I have included only the comments which I jotted down in my visiting diary. In view of the youth of the patients and the invariable recovery I did not feel justified in taking blood samples to establish a leucopenia followed by a return to normal. However, during the period discussed, no cases of measles were notified to the medical officer of health and none of my partners in a practice of over 10,000

patients saw any cases of rubella. None of the older members of the families developed rubella, although I watched particularly for it. Cases 1 and 6 demonstrated the infectivity and incubation period. Case 1 was an adopted son aged 3½ years, who developed the rash two days after his adopted sister, aged 18 days, was introduced into the house from a maternity home outside the area. She developed the rash 12 days later. In all cases the rash was typical of roseola infantum. The last patient, whose illness occurred at a much later date, lived out in the country. The mother told me that two babies of about the same age, in near-by cottages, had had a similar rash and fever, but I did not see these cases.

Summary and Conclusion

Roseola infantum is a distinct entity with characteristic age incidence, epidemiology, signs, and symptoms which should be more frequently diagnosed.

It has been obscured in the past by a tendency to dismiss unusual rashes in infants as teething, sweat rash, drug sensitivity, or even "slight measles" or "mild scarlet fever," or, more excusably, German measles.

The alternative name of exanthem subitum—the unexpected rash—should not excuse our failure to think of it in any case of unexplained fever in the critical age groups. I personally prefer the more descriptive name originally bestowed by Zahorsky. Its recognition may prevent the unnecessary use of antibiotics or other drugs, and will certainly give reassurance to anxious parents.

Treatment has not been mentioned, as this is purely symptomatic unless the rare suppurative complications arise.

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The ways in which the two great Asian countries of India and Japan have struggled with their problems of excessive population are reviewed by P. E. P. in "Population Policies in India and Japan" (Planning Broadsheet No. 378). In India the need to feed adequately from domestic sources a population which increases by five million a year has been met by an imaginative series of five-year-plans covering industry, agriculture, and public services. In these, birth control is integrated with a family service including sex education and marriage guidance. In 1951 Dr. Abraham Stone, for W.H.O., organized controlled experiments in the rhythm method, which is in some respects consonant with Indian thought and custom, but the results were disappointing. The Indian Government, however, accepted most of the recommendations of the Family Planning Research and Programme Committee for encouraging clinics, research, and the setting up of voluntary as well as government agencies. In Japan only American financial aid has in recent years buttressed the nation's economy against collapse, says the report. Between 1945 and 1953 Japan's population increased by 15 million. In 1948 a Eugenic Protection Law facilitated the termination of pregnancy for physical and economic reasons, so that now over a million abortions are procured each year; abortion replaces infanticide, the traditional method of population control. Last August, however, the Japanese Minister of Welfare's Advisory Council on Population Problems announced that birth control was preferable to abortion and advocated government sponsored clinics. But these recommendations have not yet been adopted as the official policy.