# Section of Ophthalmology

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## Retinal Hæmorrhages in the Newborn.

By DR. FRANCES RICHMAN (Brooklyn N.Y.)

THE material presented is based on an ophthalmoscopic study carried out at the King's County Hospital, Brooklyn, of 531 newborn infants, all between 1 and 8 days old, and it includes the obstetrical data for each mother.

Although the work as originally planned is now completed, new aspects have arisen which point to the necessity for far more work in the future. There can be no doubt that what has been done is merely a small part of an eventual whole. For instance, speculations crop up regarding the relationship between retinal hæmorrhages and congenital amblyopia, or between macular hæmorrhages and squint, and so-on. Only a thorough study of a great number of children previously examined at birth can confirm or disprove such hypothetical queries. Only with time can sufficient facts emerge to make speculation a certainty.

I shall omit the numerous details of this study, the theories as to ætiology and prevention of hæmorrhages, as well as references to other research workers along the same lines, and shall take a few moments to demonstrate the most interesting points.

Amazing differences are seen in the normal fundus of the newborn, even as they are seen in the normal adult fundus. The discs, for example, show many variations. At least six groups can be distinguished, each having special characteristics. Most common is a disc of medium size, having a well-marked pigment ring either complete or partial; the same size disc without the pigment border is next in frequency. A large or small cup may be present in any type of disc. This one shows a decidedly small nerve head which appears quite crowded, and brings to mind the pseudo-neuritis of the young adult. Finally, there are two types bearing a strong resemblance to the adult myopic disc, the one with a scleral ring all around it, the other having a pigmented crescent.

The colour of the disc requires special mention. A peculiar greyish tinge is definitely apparent in every newborn baby's disc, and is altogether normal. There is a scientific reason for this which Miss Ida Mann knows well, and I hope she will give us the benefit of her knowledge. The practical application of this fact comes

when an opinion is required as to the vision of a young infant. Here, in spite of the grey colour of the disc, a good prognosis can be safely made.

Quite striking, in the normal infant's eyeground, is the complete absence of choroidal tessellation. The fundus is either diffusely red, with no choroidal details showing, or it is light-coloured, with a network of choroidal vessels visible throughout. Whatever the colouring may be, the macular area is always a deeper red than the rest. Normally, the foveal reflex is not seen, and the macula itself is only localized by its relationship to the disc.

Hæmorrhages are of three main types. Bright red, flame-shaped extravasations in the nerve-fibre layer are most common and least damaging, probably because they are most quickly absorbed. Dull red, diffusely round hæmorrhages lie in the deeper layers of the retina, and may persist for ten days or more. Longest-lasting are the pre-retinal collections of blood, very dark red and well circumscribed, having a tiny reflex at the summit from the light of the ophthalmoscope.

The macula may have a hæmorrhage almost exactly resembling a "hole in the macula" of traumatic origin. Occasionally, the disc is involved as well. In these cases it is impossible, actually, to say how much hæmorrhage has occurred along the fibres farther back, or how much damage has been suffered by the sensitive papillo-macular bundle in its course to the macula.

The popular notion that retinal hæmorrhages occur in direct relation to the length of labour is completely upset by this graph. The hæmorrhage curve in the inset is seen to conform exactly with the birth curve, and is entirely unaffected by the duration of labour. In this series the greatest number of babies was born at about seven hours, and the occurrence of hæmorrhages was greatest then. I believe Mr. Frank Juler found the same to be true in his series of cases.

The incidence of hæmorrhages in the entire group of 531 babies was 12·2%. Firstborn babies showed 17·5%, as compared with 9·2% in the subsequent babies, but firstborns delivered with forceps ran up to 20·6% as against 13·8% in firstborn spontaneous deliveries. The incidence found by various investigators is not constant. A great many factors enter into consideration, not the least of which is the time of examination. In a series of infants I am now examining at the Queen Charlotte Lying-in Hospital—by an arrangement made through the courtesy of Mr. Juler—the incidence is rather higher, probably because the examinations are done within twenty-four hours of birth, before any absorption of hæmorrhage has taken place.

In conclusion, I may say I am thoroughly convinced that every infant is entitled to an eye examination at birth as a routine procedure.

*Discussion.*—Mr. FRANK JULER said he was glad that Dr. Richman was delaying her stay in this country in order to do some research work at Queen Charlotte's Lying-in Hospital, at which institution he had done a similar piece of work ten years ago. It was interesting to him to find his results endorsed. From the figures now presented it seemed that babies in 1936 had retinal hæmorrhages in almost the same proportion as in 1926, and the proportion in New York was about the same as in London.

The point made by Dr. Richman that these cases should be examined within twenty-four hours of birth was one on which he also had insisted ten years ago. At first, he looked at these cases when he could get to the hospital, which might be four—even seven—days after the birth. In some he made the inspection within twenty-four hours, and in some the retinal hæmorrhage had disappeared in the next day or two. It was extraordinary how quickly the hæmorrhages could vanish, and that was particularly so in the case of the flame-shaped hæmorrhages, i.e. the superficial ones. The round areas looking like clots took a longer time in disappearing.

Dr. Richman's observation as to being able to distinguish the level of certain hæmorrhages, was new to him. He had seen these round clots in the macular region, and did not feel sure whether they were in the retina, or in front of it; his idea was that they

were at the pre-retinal level. Dr. Richman had said that there was a reflection of light from the centre of those clots, and that suggestion was of value as indicating a pre-retinal position.

A number of interesting points arose from this communication. It seemed quite definite that there was no relation between the onset of the hæmorrhages and the duration or severity of the labour; even a severe second stage made no difference to the occurrence of the hæmorrhages. He put forward the idea that the incidence might be due to some local anatomical variation in the individual orbits, that it might depend on the connexion between the central retinal vein and the cavernous sinus, i.e. whether the central retinal vein went straight into the ophthalmic vein, with very few lateral anastomoses. If there was much anastomosis between those vessels and the extracranial venous channels, there would be less likelihood of hæmorrhage occurring.

Another related point was the general agreement that retinal hæmorrhages must be due to intracranial pressure at birth. He looked at the eyes of a number of infants who had been born by Cæsarean section; he had seen the fundi of 19 babies so born, before the commencement of normal labour, and none of those showed these hæmorrhages. There was one case reported by Jacobs in which, after Cæsarean section, hæmorrhage was found, but in that instance labour had been in progress for eleven hours before the operation was performed.

One often saw clinical cases of amblyopia with and without squint or cases where there were macular changes of obscure origin and one was tempted to say it might be due to hæmorrhage at birth. He had followed up some of his cases, but only traced five of them. The notes showed they were all cases in which there were dense macular clots, i.e. the more severe type of retinal hæmorrhage. Three were seen twelve months after birth, one twenty months after, and one three years after birth, and none showed a sign of squint or amblyopia, or any fundus change.

Miss IDA MANN said that Dr. Richman had mentioned the embryological explanation of the grey colour of the disc. This was probably that the myelination, spreading from behind forwards, had often not reached the lamina cribrosa at the time of birth; the greater translucency of the disc from this cause often suggested some sort of optic atrophy. She had been "caught" when asked to examine a very small infant, being required to say whether or not it was blind. It was easy to mistake that colour for something pathological. She was now convinced, however, with Dr. Richman that it was the normal colour of the disc at birth.

She hoped that Miss Richman would continue the follow-up of these cases, as many points would probably emerge from it, and some not entirely connected with the fate of retinal hæmorrhages. One would like to know whether any permanent results ensued in the cases in which hæmorrhages could be seen at birth, e.g. amblyopia, macular scarring or squint. One of the cases shown had a scleral ring, and it would be interesting to know whether the myopic type of disc was usually present at birth, and, if so, what was the connexion between such a condition and the subsequent refractive history, as it might alter the current conception of the production of certain myopic changes. Further, there was the question whether hæmorrhages could be attributed to predisposing congenital abnormalities when they were traumatic.

Mr. LEIGHTON DAVIES said he thought that in seeking for the cause of these hæmorrhages in the newborn, the effect of the tying of the umbilical cord could not be excluded. It made a great difference in the venous circulation, and it might have a bearing on the causation of some of these hæmorrhages.

Dr. RICHMAN (in reply) said that she had not entered into the question of the technique of examination. She used ½% homatropine solution for dilating the pupils. Two instillations, at an interval of half an hour, seemed to suffice. She had tried atropine and other mydriatics, but they were not more effective than homatropine. A solution of adrenaline was used, but that was discontinued because of its effect in the form of wheals on the skin of the infant. Stronger solutions of homatropine also were discarded in favour of the ½% strength. The periphery could be very distinctly seen, and in some cases the

hæmorrhages could be seen as far towards the periphery as the vision of the observer extended. Most of the hæmorrhages were round the disc, but some were more extensive.

The question of their relative frequency in vertex and breech presentations had not been considered. Some of the drawings which she had shown were from breech presentations.

No pigmentation was present in the eye of either the white or the negro baby at birth. The colouring in the child could be determined to some extent by the colour of the retina, but only as it showed the network of choroidal vessels, or showed a diffuse, even redness. One of them would probably be a blonde child, and the other would have a dark iris and dark hair.

All the points brought up in discussion—ætiology, technique, etc.—would be dealt with in a future publication.

## Dysostosis Cranio-Facialis

*(With Report of a Case)*

By A. J. BALLANTYNE (Glasgow)

*(From the Tennent Memorial Institute of Ophthalmology)*

WITHIN recent years there has appeared in continental journals a considerable body of new literature bearing on the dysostoses of the cranial and facial bones.

This somewhat loosely-defined group includes the conditions variously described as hereditary cranio-facial dysostosis (Crouzon's disease), oxycephaly (tower skull, turricephaly), acrocephaly, acrocephalo-syndactyly (Apert's disease) and hypertelorism.

The classification and nomenclature of the dysostoses as a whole are far from satisfactory.

While the clinical features which attract attention, and which have suggested the names of the above-mentioned types, are the deformities of the vault of the skull and of the facial mass, Bertolotti (1910) has shown that there is reason to believe that an element common to them all is a premature synostosis in the base of the skull, to which the visible deformities are secondary.

To the ophthalmic surgeon the interest of these cases lies principally, of course, in the ocular complications, taking the form, chiefly, of optic neuritis (papillœdema), optic atrophy, and forward displacement or dislocation of the eyeballs.

The case to be described appears to belong to the group described as hereditary cranio-facial dysostosis, or Crouzon's disease. The patient, a boy, aged 4 months, was stated to have had a head deformity since birth. This had not changed its character, but the head had increased in size. Practically from the earliest days the eyes had shown a tendency to come forward in front of the eyelids when the child cried, and within the last few days it had been found impossible to replace the left eye behind the eyelids.

*Condition of the eyes.*—Both eyes were found to be very prominent. In the right eye the sclera was exposed almost to the equator, and the eye could easily be dislocated in front of the lids, but it could also be easily replaced. The left eye, on the other hand, was found dislocated in front of the eyelids and could not be replaced. The cornea of the right eye was transparent, and it could be seen that there was a coloboma of the iris downwards and slightly inwards. In the left eye, owing to the lack of the protective covering of the lids, the conjunctiva bulbi was