

DISEASES AND FATE OF TWINS

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It is with the modern biological, rather than with an anthropological, study of twins that the present paper is concerned. Grassl expresses the opinion that multiple pregnancies are neither atavistic nor the result of variation, but simply indicate an excess of the natural or usual fertility.

A. Orgler recorded some observations on twins from his examination of twenty-six pairs. The weight was the same in only five pairs. The difference in weight was more marked when the twins were of different sex. They usually increased in weight at the same rate, though frequently one continued to be heavier than the other for a considerable time, unless one or the other fell ill. He also observed that if both twins fell ill, one of them usually lost more markedly in weight than the other, and when they regained health, both increased in weight at the same rate, though the original disproportion continued for some time.

In a number of cases the heavier child is more resistant and becomes less severely ill when attacked than the lighter one. In a number of cases this does not hold. Frequently there is a difference in the length of the children at birth. While many of them seem to increase at the same rate, in a certain number the increase in length occurs at different rates, so that the one shorter at birth may reach the height of the longer one or even overtake him.

The average weight of twins is approximately equal to the weight of a single newborn. The average weight of uni-sexual twins was 3960 grams, though the female pair weighed 840 grams less than the male. The average weight of the male pairs was 4380 grams, of female pairs 3540 grams, and the average weight of one twin was 1980 grams, though there was a difference in the weight of the sexes. Thus, boys weighed on the average 2190 grams, girls 1770 grams.

Concerning the height of newborn twins, it may be noted according to the statistics of N. Miller that the

average length was 43 cm. and that the girls averaged 3 cm. less than the boys. The average height of boys was 45.5 cm., that of girls 41.5 cm. Newborn twins, especially those of the same sex, may be approximately of the same height and weight.

On the other hand, there may be great disparity in their weights, varying from 200 to 800 grams and, in extreme cases, even 1000 grams. Differences in height are also noted. Sometimes one infant is 2.5 cm. longer than his mate.

Differences in the development may be accounted for at times on a purely mechanical basis. In some instances the nutrition of the two fetuses is unequal. In one case the umbilical cord may be short and straight, in the other one, long and winding. It is evident that in the former the blood supply would be greater and the nutrition would be better. At other times, one placenta is located favorably on the uterine wall, and the other one is attached in an unfavorable position. The greater the respiratory surface of the placenta, the better the fetus develops. In other words, the larger the placenta, the more closely it is approximated to the uterine decidua, and the more favorable are the conditions of the fetus.

Newman states in his "Physiology of Twinning" that there is a popular impression that in human twins one is usually stronger and more vigorous than the other. Practical experience tends to bear out this impression. Even in identical twins, there is usually a more vigorous twin who is the dominant member of the combination. One twin tends to gain a physiological ascendancy over the other to the slight or very great detriment of the latter. Spaeth found no evidence that the twins of either type had any definite physiological effect upon each other, though he grants as an evidence of inter-influence the condition of *situs inversus viscerum*. Newman points out the disadvantages of twinning by saying that when two or more fetuses come to occupy the space usually filled by one, the twins, whether of the one egg or two egg type, crowd each other and compete for the common food supply. In the case of two egg twins, the competition is for placental surface.

The period of uterine gestation is at best a hazardous one. In addition to those hazards that are met by single embryos and by two egg twins, there are certain very serious special dangers that fall upon one egg twins by reason of their close genetic relationship. One egg twins vary according to the period when the placenta is developed, and consequently one may receive more nutriment than the other. Moreover, on account of the difference in the blood supply to the two fetuses, one is more favored than the other, a condition which may even lead to the death of the less favored. Because of these variations in food supply and as a result of one fetus crowding upon the other, there is not only a disproportion in size and weight of the two infants, but malformation and conditions of arrested development may be noted in the weaker twin. Thus, one of the pair may be strong and healthy at birth, the other weak and delicate physically and defective mentally.

In my practice I have such an instance. The weaker one was extremely difficult to nourish, was very much retarded physically, and has remained defective mentally, while the other child developed rapidly and normally. The twins are now fifteen years old, the one a tall, bright, well-developed girl, while her sister is infantile in size and has attained no mental development. I recently saw a pair of male twins, three years old. One was bright, well grown, and his development was perfectly normal. The other weighed only twenty pounds at three years, teeth developed late, and his static development was markedly delayed. He was mentally much retarded and unable to talk. The normal twin's birth weight was six pounds, the other's three pounds. Instances of this kind must be very frequent.

Dentition may occur at different periods in the two infants, and this does not always depend on the severity of the rickets. In one pair that seemed free from rickets, the first dentition occurred at the seventh month, while the other infant developed his first teeth two months later. At ten months the first infant had eight teeth, while the other had only two. The difference be-

tween the eruption of teeth in the two babies may be as long as four months.

Francis Galton made a study of twins from the biologic and genetic aspects, and hoped to be able to differentiate between the effects of tendencies received at birth and of those that were imposed by the special circumstances of their afterlives. He sent questionnaires to persons who were either twins or near relatives of them. He received eighty replies, thirty-five of which entered into instructive details. In a few of these not a single point of difference could be specified. The color of the hair and the eyes was almost always identical. In many instances the twins were of the same height, weight, and strength. In others there was a notable difference in these factors, though the resemblance was in other respects close.

Gesell reports twins who showed superior intellect. They both sat up at six months, walked and talked at eleven months, learned French at three years, and were in the seventh grade at the age of nine. They resembled one another, both physically and mentally. In fact, there was no noteworthy distinction between the two. Their physique, countenance, demeanor, conversation were completely similar.

Homologous twins usually show marked similarity physically, as well as mentally. They resemble each other in weight, body structure, voice, and gait. They may learn to speak and walk at the same time. Not rarely they show the same anomalies and faults of development. They may become sick at the same time and die almost at the same time.

Ganther and Rominger studied the finger prints of five pairs of one ovum twins and forty-two pairs of two ovum twins. They found that in the five pairs of one ovum twins there was marked similarity in the finger prints, and in the system of lines of the hands. In the two ovum twins there is a certain similarity of structure, but never the striking correspondence of the system of lines. They conclude from their studies that a striking similarity of the structure of the lines of the hands indicates that the twins are uni-ovular.

Miller describes 247 pairs of twins of the same sex which he studied at the Moscow Findelhaus. He assumed that thirty were homologues. Twenty-three showed similar or analogous malformations. In five pairs the twins had hypertrophic umbilicus. Four had dolicocephalic skulls and four others congenital phimosis. Two had congenital depressions of the sternum. Two other pairs had marked shortness of the frenulum of the tongue.

Some of the twins showed anomalies occurring in both during the early days of life as a result of acquired disease. Thus, two boys had simple pemphigus. Two other male twins both developed mastitis on the left side, followed by erysipelas. They both recovered practically at the same time.

The temperature of twins sometimes varies at birth. One infant may show two- to three-tenths of a degree higher temperature than the other. As a general rule, well-developed twins have a slightly higher temperature than those who are weakly.

Prematurity. Twin pregnancy is a relatively frequent cause of premature birth. Ylppö's series of prematurity showed that out of 688 cases, 19.2 percent, or 128 cases, were twin babies.

The prematurely born, whether singly or in pairs, are predisposed to a variety of disorders. The susceptibility of prematures to rickets is a common observation. Huenekens found that of seventy cases of premature twins, fifty-eight developed definite signs of rickets. He observed that the condition appeared sometimes before the fourth month of life. Craniotabes, an early symptom, may be present in the sixth week of life.

Other rachitic manifestations occur in premature twins as well as in prematures of a single birth. Among the early symptoms may be mentioned rachitic rosary and rickets of the long cylindrical bones. In premature infants there is a deficiency of the calcium content, as well as of other mineral substances. By the third or fourth month, there is a lowered phosphorus and calcium content, and rickets and its sequelae result.

Premature or underweight newborn twins frequently manifest spasmophilic diathesis and tetany. Evidence of spasmophilia may be found in these infants even if they are born at full term. An instance is cited where, in a pair of twins, the one developed laryngismus stridulus, facial phenomenon, and electrical over-excitability, giving all the symptoms of spasmophilia, while the other remained free from this disorder. It has also been observed that craniotabes may be present in one infant and absent in the other.

Langstein reports a case of twins in whom convulsions always appeared when artificial food was used as a substitute or complement for breast feeding. It should be noted, however, that the twins did not develop the tetany at the same time. One pair developed spasmophilia within seven to twelve days after the administration of artificial food, the other eighteen to twenty days thereafter.

A pair of twin girls, nine weeks old, came into my service on the 19th of July, 1922. The first one had convulsions lasting three days. The other twin had convulsions which lasted a week. They both had marked craniotabes, Harrison's groove, slight rosary, and protuberant abdomen. The Chvostek sign, as well as carpopedal spasm, were present in both. Both were breast fed. Thus, it is evident that these nine weeks old infants had almost similar attacks of tetany with florid rickets.

In twins not prematurely born, rickets and spasmophilia in both children is a frequent occurrence and is commonly observed. Orgler records in his series a case of rachitic twins where the degree of intensity was different. The one was severely affected, the other only moderately. He also recorded a case in which one child had developed scurvy, the other had not. Alfred Hess says that twins have a special tendency to develop rickets, and this is partly due to a sub-normal quota of anti-rachitic constituents stored in their tissues and also to the variable susceptibility of infants to rickets.

Anemia. The anemias of prematures may be of a high degree and may be prolonged into the second and

third year, though this condition may occur in children born at term.

A pathological anemia occurring in twins may affect one or both. The hemoglobin is usually low and the reduction may be observed during the first days of life. Occasionally one or both parents show marked debility or anemia. Charles Herrman states that twins and single infants born prematurely come into the world with an imperfectly developed blood forming system and, if some injurious external agent affects the infants, this latent inferiority soon manifests itself. He says that some of these infants show their anemia from birth, some not until later. Von Jaksch's pseudo-leukemic anemia may occur in one or both twins. Finkelstein reports twins who developed a clinical type of pseudo-leukemic anemia after infections.

Chlorotic anemia has been described from Finkelstein's clinic by Kunkel as occurring in prematures and twins. Kunkel's investigations considered the blood changes in premature and feeble children. Among this group were seven pairs of twins, sixty prematures, seven feeble children. He found that most of them suffered from a chlorotic type of anemia characterized by oligosideremia and slight diminution of the cellular elements of the blood. Spleen and lymph nodes are not enlarged. This form of anemia occurs very early in life. This is particularly true of the prematures. Kunkel gives several instances where the twins were much below normal in weight and the anemia continued until one infant was four months old. At that time his hemoglobin was forty-three per cent. When the children were taken out of doors, the condition improved, though at the sixth month the hemoglobin content had reached only sixty per cent. Occasionally only one of the infants becomes anemic, though as a rule both are affected, but there may be a difference in degree. Senator reported a case of splenic leukemia which developed in twin sisters of eighteen months; both died about the same time.

Mental Affections. Mongolian idiocy may occur in one or both twins, though in the majority of the cases only one of the pair is affected. Halbertsma quotes sixteen

instances where one of the twins was a mongol and two where both were mongols.

The mental affections of twins do not differ in form or in frequency from those of other individuals. A limited number of psychic disturbances have been reported which do not differ from those encountered in children of single birth.

Epilepsy of both children with mental deficiency is reported. A few cases of dementia precox have been recorded. Hydrocephalus occurred in a pair of twins. One was delivered by craniotomy, the other was born spontaneously. There was no syphilis or alcoholism in the parents. The father was by occupation a painter, but did not suffer from lead poisoning. The second infant died on the twelfth day.

Soukhanoff made an analysis of thirty-three cases of insanity in twins in 1900. In some there were congenital mental defects, in one dementia precox, in one general paralysis. In most cases the twins were uni-ovular, alike in appearance and mental character, and the form of insanity in each pair was the same.

Infections. According to Orgler's observations, the behavior of twins towards infectious and nutritional disturbances was not always the same in both. One twin became ill with bronchitis, while the other developed whooping cough. The first recovered in two weeks, while the latter remained ill for two months.

They often reacted differently to infectious diseases. One twin died of generalized miliary tuberculosis, while his mate developed tuberculides and a strongly positive Pirquet reaction and the disease ran a more protracted course. In those instances where one twin developed rickets or exudative diathesis, the other had it also, though the intensity of the manifestations was frequently variable, the disease being intense in one child, mild in the other.

There is also recorded a case of single ovum twins who seemed to be similar physically and mentally, but who showed some difference in their resistance to infection. Whether this difference in resistance is peculiar to one ovum twins cannot be definitely stated. It may be as-

sumed that there has been an unequal division of the germ plasm in the uniovular variety which might account for the variable behavior to infection.

Three sets of double ovum twins, observed by Orgler, showed uniform behavior to infection. However, in the case of twins of opposite sex who were admitted to the hospital at the age of five weeks and remained there for a considerable length of time, the boy, at the age of six months, developed measles, while the girl remained free from the disease, notwithstanding the fact that they occupied adjoining cribs.

Ballantyne in his "Antenatal Pathology and Hygiene" records a case where both twins acquired variola from their mother. In another case, one was affected while the other escaped. In a third, both fetuses exhibited the eruption. One presented many pustules, while the other had only a few.

During infancy and early childhood, twins, like other siblings, develop almost simultaneously intestinal upsets, grippal infections, measles, mumps, chicken pox, scarlet fever, and other infections.

Syphilis. Where one or both parents are syphilitic, the twins, as a rule, suffer the same fate as does the fetus in a single pregnancy. There are cases recorded, however, where one of the twins presents evidence of manifest lues while the other seems to remain immune. Grete Singer reports twins, a girl and a boy, one of whom was clinically and serologically luetic, the other normal. The non-infected infant showed negative Wassermann reactions during a period of two years.

Finger reports cases of dissimilar severity of syphilis in twins, i. e., one was more severely affected than the other. There are numerous corroborative reports in the literature, in which one case was syphilitic, the other healthy. Rosinski reported syphilis in twins. The boy showed severe symptoms of hereditary lues. The girl, who was observed for twenty-four years, remained entirely free from the disease. No satisfactory explanation can be found for this inequality in the distribution of the disease. Why one child should be infected and the other remain free is difficult to conceive. It has been

suggested, however, that the difference in the severity of the disease is due to different modes of infection. It is thought that this is more probable than that there is a difference of immunity in the two fetuses.

Mortality. Twins in general are characterized by low vitality. The death rate is much greater than in single newborns. In the first weeks the mortality is forty percent. It is generally stated that twins have thirteen times less chance to live than ordinary newborn babies. In the report of Miller's cases at the Moscow Infant Asylum, 3883 pairs of twins were observed among 277,902 children. 62.9 percent of these died during the first weeks of life. In half of the cases, both twins died on the same day. In the remainder, the one lived one or two days longer. Septicemia and syphilis were frequent causes of death. The greatest mortality of those infants who survived the first few weeks of life seems to concentrate in the first and second year. After the fifth year of life, the mortality of twins and non-twins is about the same.

It has been estimated that out of a hundred pairs of twins born there are eighty pairs who survive. In fifteen pairs, only one child survives; in five pairs both children die. According to Hecker, fifteen percent die during the first eight days. It has also been said that twin girls seem to have greater viability than twin boys.

Since Galton's memorable studies no investigation has been conducted on the pathological aspect of twins. The British Medical Journal of 1912 contained a very interesting and suggestive editorial on twinship and fame. The editorial was suggested by the remarks of Doctor Kaiser, of Dresden, who stated that he knew of no famous man who had a twin brother. A similar query had been raised by Doctor Simpson in the Edinburgh Medical Journal of 1862. Simpson was not aware of a single instance in which a twin had distinguished himself intellectually. The editorial writes takes issue with these gentlemen, and goes on to show that there were several twin brothers who had won more or less fame. In attempting to collect information on this subject, it

was found that no records of morbidity or mortality in twins were available.

It is to be regretted that there are not more data at hand concerning the development, physical and mental, of twins during their later lives. To make such data available, it would be important for obstetricians to record in every instance whether the twins originated from one or two eggs, which information should also be supplied to the families. Parents, physicians, teachers should be able to furnish significant information. Twins themselves, or their friends, might in some instances contribute important biographical sketches, and life insurance companies and bureaus of vital statistics should furnish details about the causes of death. Information of this kind would be of great interest, if not of practical value, to a great number of people. Knowledge of such facts would constitute a noteworthy contribution to medical science.