

CORD ROUND THE NECK *

AN EVALUATION OF ITS SIGNIFICANCE

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INTRODUCTION

The "Cord Round Neck" - the condition in which the umbilical cord is wound around the neck of the foetus - is believed by many obstetricians to be the underlying cause of unexplained foetal distress, neonatal depression, and has even been attributed to be a frequent cause of perinatal mortality. During my postgraduate sojourn at the Aberdeen Maternity Hospital, in Scotland, United Kingdom, my senior colleagues were struck by the high frequency with which "cord round neck" occurred amongst the perinatal deaths, discussed at the weekly perinatal mortality conferences. It was felt that the occurrence of "cord round neck" in most of the perinatal deaths was incidental and innocent.

On the advice of Sir Dugald Baird, a complete and comprehensive survey of this condition—"cord round the neck" was undertaken at the Aberdeen Maternity Hospital. It was a prospective study, in which all staff members were requested to record every case of "cord

round neck" at delivery. In addition, it has been the practice in this Hospital to maintain a comprehensive record system, including the routine autopsy of all perinatal deaths. The entire Survey is extensive, but in this short paper, the significance of the "cord round neck" will be evaluated by a study of only 3 aspects of this condition, namely, the incidence, foetal distress, and perinatal mortality patterns.

Incidence Pattern of "Cord Round Neck"

During the calendar year 1961, 1st January to 31st December inclusive, there occurred 3,917 births at the Aberdeen Maternity Hospital and the three associated "Maternity Homes"; and of these, 1,278 infants had one or more loops of cord wound round their necks. This gave a gross incidence of "cord round neck" to be 32.6% or 1 in 3.1 births. The Aberdeen Maternity Hospital has been a well-known centre for the study of the epidemiological aspects of obstetric problems. This is because a very high proportion of all Aberdeen City

TABLE I

Incidence Pattern of "CORD ROUND NECK" Births

No. of Births in 1961 with "CORD ROUND NECK" delivered at A.M.H.	-	=	1278
Total No. of Births in 1961 delivered at A.M.H.	-	=	3917
Gross Incidence of Births with "CORD ROUND NECK"	-	=	32.6%
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No. of City Primigravid Births delivered at A.M.H. in 1961	-	=	1111
Total No. of Primigravid Births in the City of Aberdeen in 1961	-	=	1171
% of City Primigravid Births delivered at A.M.H. in 1961	-	=	94.9%
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No. of City Primigravid Births with "CORD ROUND NECK" at A.M.H.	-	=	378
No. of City Primigravid Births delivered at A.M.H.	-	=	1111
TRUE INCIDENCE of Births with "CORD ROUND NECK"	-	=	34.0%

* Paper read at the Second Malaysian Congress of Medicine, in August 1965. Study undertaken at the Aberdeen Maternity Hospital, Aberdeen, Scotland, United Kingdom in 1963.

TABLE II

Review of Reported Incidence Pattern of "CORD ROUND NECK" BIRTHS

Authorities	Place of Study	Year of Study	Reported Incidence
Personal	Aberdeen	1960 (Early)	13.4% — 1 in 7.5 (Retrospective)
Kan & Eastman	Hong Kong	1955-6	23.3% — 1 in 4.3
Horwitz et al	New York	1963	24.8% — 1 in 4
Dippel	Texas (USA)	1963	26.8% — 1 in 3.7
Crawford	Aberdeen	1960 (late)	33.3% — 1 in 3
Personal	Aberdeen	1961	32.6% — 1 in 3.1
Personal	Aberdeen	1961	34% — 1 in 2.9 (Epidemiological)

births have been comprehensively documented in the Records of this Hospital, and this is especially so for the City primigravida. For the year 1961, 1,111 out of the 1,171 of the Aberdeen City primigravid births took place at the Aberdeen Maternity Hospital complex, and this represented 94.9% of all City Primigravid Births. Of these 1,111 City Primigravid Births, 378 presented with a "cord round neck", and based upon this epidemiological data, the *True Incidence* of "cord round neck" is 34.0%.

Review of Reported Incidence Pattern of "Cord Round Neck"

The reported incidence, in literature, of "cord round neck" has varied from about 15% to as much as 35% of hospital deliveries. Kan and Eastman (1957) found from a prospective study of 1,000 consecutive deliveries at the Tsan Yuk Hospital, that the incidence was 23.3%. Howitz et al (1964) also undertook a prospective study of 1,000 consecutive deliveries at New York, and they reported an incidence of 24.8% with "cord round neck" presentation. Dippel (1964) presented a review of maligned umbilical cord entanglements in a prospective study of 1,000 consecutive deliveries in Texas, U.S.A., and his incidence of "cord round neck" occurrence was 26.8%.

At the Aberdeen Maternity Hospital, a retrospective review of the case-records of

the deliveries that occurred in early 1960 revealed the "cord round neck" to be recorded as occurring in 13.4% (1 in 7.5) of the births. This incidence was subsequently shown to be fallaciously low, as its recording was dependent upon the awareness of the "cord round neck" and its subsequent recording by the doctor, midwife or student, conducting the delivery. In the latter half of 1960, Crawford (1962) undertook a prospective survey of this condition; and he reported the incidence of "cord round neck" to be 33.3%, after a review of 628 consecutive primigravid births at the Aberdeen Maternity Hospital. The author's prospective survey of "cord round neck" for the calendar year of 1961 represents a follow-up of Crawford's survey in this same Hospital. The author's reporting of a Gross Incidence of 32.6% and a True Incidence of 34.0% compares very closely to Crawford's findings (1962) in the preceding year.

It is apparent from this brief review that the condition of "cord round neck" is a common physiological occurrence which, in the human species, can be expected to be seen as frequently as 1 in 4 (25%) to 1 in 3 (33.3%) of all births.

Foetal Distress Pattern

Methods and Materials: The clinical material for this section of the paper is confined to the review of all booked primigravid city births —involving only patients who had received

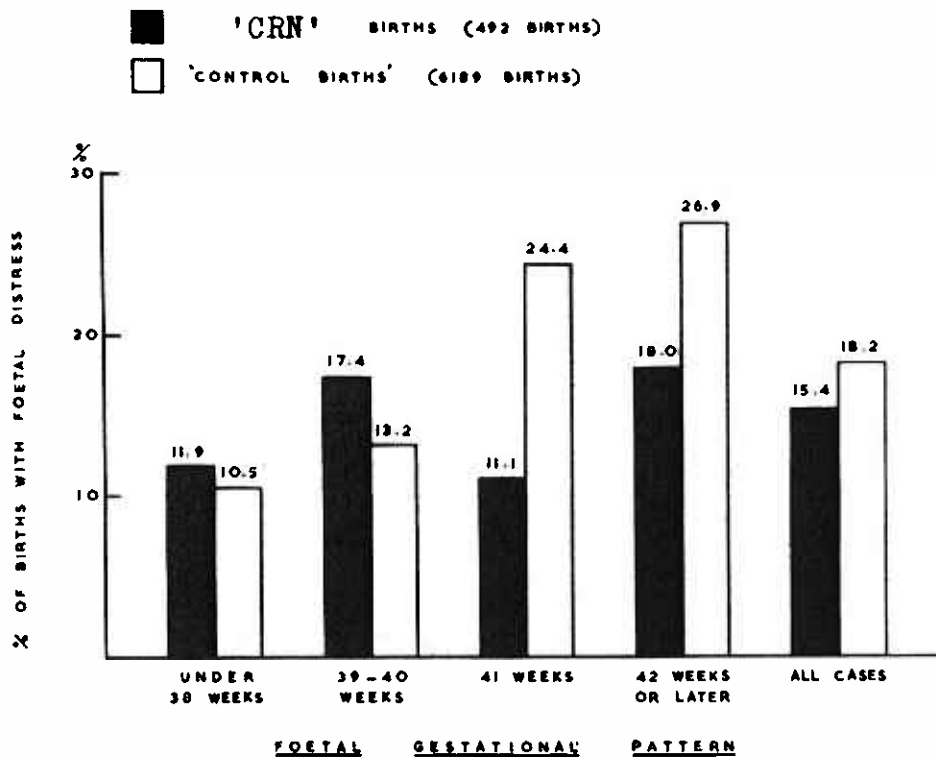


FIG. 1 - PATTERN OF FOETAL DISTRESS IN 'CRN' AND 'CONTROL' GROUPS OF BOOKED CITY PRIMIGRAVID BIRTHS BY FOETAL GESTATIONAL AGE.

'CRN' = 'CORD ROUND NECK'

their ante-natal care under the auspices of this Unit, and who were delivered either in the main Maternity Hospital, or in one of the three associated "Maternity Homes" reserved for reasonably normal cases. A routine was adopted whereby a careful note was kept of the presence or absence of "cord round neck" at each delivery, and a record made as to whether or not the "cord round neck" was clamped and divided prior to complete delivery of the infant.

In this Unit, a note is made on the patients' case—record of the foetal heart rate at intervals of about one hour during the first half of the first stage of labour (more frequently, of course, if there is foetal distress), and at half hourly intervals during the latter half of the first stage. During the second stage, the foetal heart rate is recorded at intervals of between 5 and 10 minutes. As the patients in this section of the Study were all primigravida, the majority were under observation from very early in labour.

The criteria for foetal distress both in this "Study" and in the "control" material has been based upon the following evidence: the recording of a foetal heart rate (even on a single instance) above 160 beats per minute or below 120 beats per minute; the passage of meconium

during labour (except in cases of breech presentation), or post-delivery evidence of its having been passed, (e.g. membranes, cord or infant meconium-stained, or meconium in the liquor passed immediately after delivery of the infant).

Both the "cord round neck" and "control" cases were strictly confined to "booked city primigravida births" so as to ensure the uniformity of clinical material and to allow for their comparability. In the "cord round neck" group, there were 492 births, and in the "control" group, there were 6,189 births (Baird, 1963). The latter group (control) represents the composite data of "booked city primigravida" delivered at the Aberdeen Maternity Hospital complex over several years, and this data has been made available to the author by the courtesy of Professor Sir Dugald Baird (1963), for this comparative Study.

RESULTS

In Figure 1 (above) is presented a comparative study of the percentage of births with the features of foetal distress in the "cord round neck" and "control" cases, subdivided into the

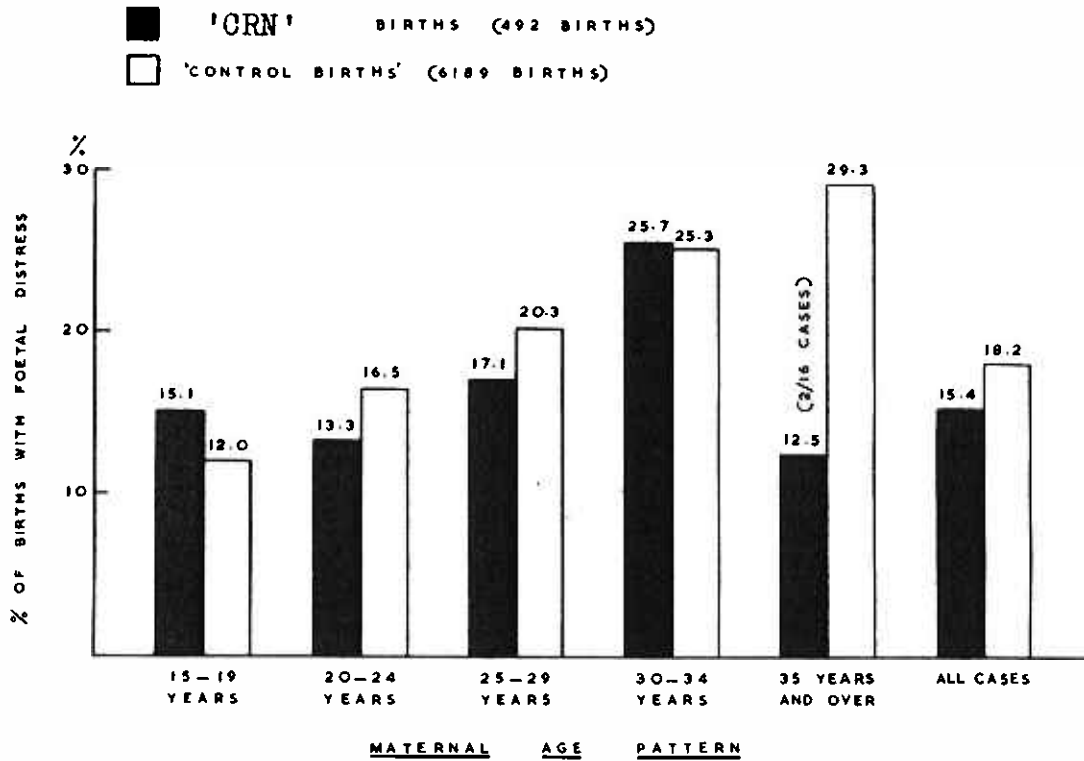


FIG. 2 - PATTERN OF FOETAL DISTRESS IN 'CRN' AND 'CONTROL' GROUPS OF BOOKED CITY PRIMIGRAVID BIRTHS BY MATERNAL AGE

'CRN' = 'CORD ROUND NECK'

various foetal gestational age-groups, as well as for "all cases". In those births before the end of the 40th week of gestation (full term), the incidence of foetal distress appeared to be slightly (though statistically not significant) higher in the "cord round neck" groups of cases as compared to the "control" groups of cases; whereas in the past-term groups of births, the incidence of foetal distress paradoxically appeared to be higher in the "control" groups of cases as compared to the "cord round neck" cases. This latter feature is paradoxical to the commonly accepted view that within a set class of births (*viz.* booked city primigravid births), the incidence of foetal distress rises *pari passu* with the gestational age, as is evident if the results of only the "control" groups of cases are scrutinised (Fig. 1)—10.5%, 13.2%, 24.4% and 26.9%. The last column represents the results for all cases in this Study, and again there is absence of statistically significant difference in the incidence of foetal distress between the "cord round neck" group (15.4%) and "control" group (18.2%) of cases.

In figure 2 (above) is presented a comparative study of the percentage of births with the

features of foetal distress in the "cord round neck" and "control" cases, subdivided into the various maternal age-groups, as well as for "all cases". In the 15 to 19 years and 30 to 34 years age groups, the incidence of foetal distress was slightly higher in the "cord round neck" groups of cases as compared to the "control" groups of cases, whereas in the 25 to 29 years, and 30 to 34 years age groups, the reverse was the case. But in none of these 4 groups of cases, was there any statistically significant difference in the incidence of foetal distress between the "cord round neck" and "control" groups of cases. In the 35 years and over age-group of cases, the foetal distress incidence of 12.5% for "cord round neck" group of cases is statistically not significant, as it involves the study of only 2 out of 16 cases, and hence cannot be compared to the 29.3% incidence in the control. As in Figure 1, the last column represents the results of "all cases" in this Study, and again there is absence of statistically significant difference in the incidence of foetal distress between the "cord round neck" group (15.4%) and "control" group (18.2%) of cases.

PERINATAL MORTALITY PATTERN

In this study of 1,278 consecutive "cord round neck" births, there were 26 perinatal deaths. Routine autopsy studies were undertaken in all these deaths, except for 2 cases of advanced maceration, where autopsy studies were not feasible, and where the causes of deaths were clinically obvious—viz. extreme prematurity (1 lb. 7³/₄ ozs.) and gross hydrocephalus. A summary of the autopsy/clinical causes of these 26 perinatal deaths is presented in Table III (below).

In 24 of these 26 cases, the causes of death were clear-cut. But in the other 2 cases, the deaths were classified in the Hospital records as "M.U. Deaths"—mature unexplained deaths. Both these foetuses were in an advanced state of maceration, death having occurred well before the onset of labour. It is fair to postulate that the presence of the "cord round neck" in both these cases was coincidental, and in no way contributory to these foetal deaths.

In Figure 3 (below) is presented a comparative study of the perinatal mortality rate patterns, at the Aberdeen Maternity Hospital for 1961, between the "cord round neck" group and other groups of cases. It is apparent that the gross perinatal mortality rate of 20.3/1,000 births for the "cord round neck" group of cases is very much lower than the perinatal mortality rates for "all births" (38.0/1,000 births), and for those births without the "cord round neck" (46.6/1,000 births), during the same period (1961) and in the same Hospital. Such paradoxical results provide further evidence that there

is no correlation between the occurrence of "cord round neck" and perinatal mortality.

CONCLUSIONS AND SUMMARY

1. The "cord round neck" is a common physiological occurrence, which can be anticipated as frequently as 1 in every 3 births (34%).
2. The results of this comparative Study indicate that the presence of a "cord round neck" does not precipitate or predispose to foetal distress. This comparative Study was undertaken in a highly selected class of patients,—namely the Hospital Booked Primigravida, and thereby other variable factors, such as variations in the ante-natal and intrapartum obstetrical care, were reduced to the barest minimum.
3. The perinatal mortality patterns in this Survey have been reviewed on the basis of the clinical, autopsy, and comparative statistical data; and once again there was no significant evidence to incriminate the "cord round neck" to be responsible for the perinatal deaths.

ACKNOWLEDGEMENTS

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TABLE III

Summary of the Perinatal Mortality
(26 Deaths Reviewed on the Basis of Autopsy/Clinical Data)

Prematurity	7	} 24 Deaths
Prematurity cum Hyaline Membrane Disease	...	...	...	...	...	3
Hyaline Membrane Disease	...	...	...	...	...	2
Placental Insufficiency Syndrome	...	...	...	...	...	6
Foetal Abnormalities	...	...	...	...	...	2
Concealed Accidental Haemorrhage	...	...	...	...	...	1
Acute Volvolus with Gangrene	...	...	...	...	...	1
Severe Intra-Uterine Pneumonia	...	...	...	...	...	1
Severe Rhesus Immunisation	...	...	...	...	...	1
Mature Unexplained Deaths (M.U.Death)	...	...	...	...	...	2

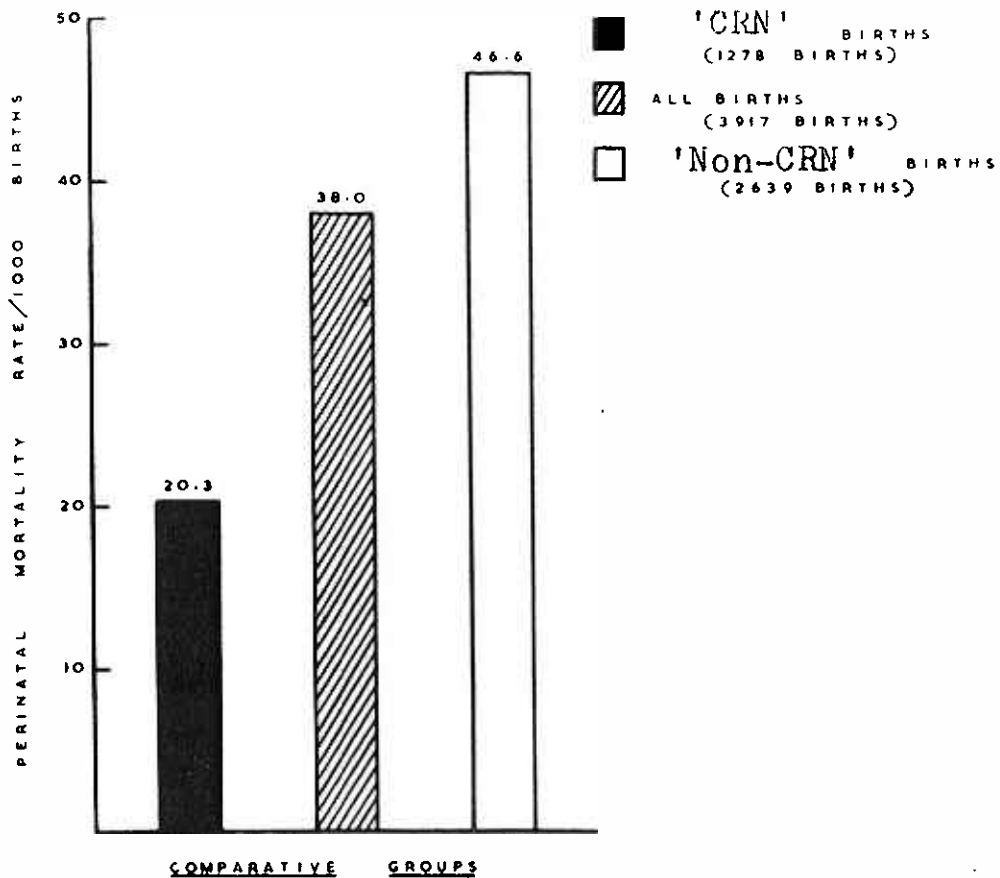


FIG. 3 - PATTERN OF COMPARATIVE PERINATAL MORTALITY RATES AT THE ABERDEEN MATERNITY HOSPITAL FOR 1961

'CRN' = 'CORD ROUND NECK'

ted me permission to collect the necessary data from the Aberdeen Maternity Hospital, and to read and publish this paper.

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