

The Benefits and Hazards of fetal monitoring
under competent and objective aspects

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In 1977 nearly a thousand participants at the European Congress of Perinatal Medicine in Vienna were present at a Round-Table with an identical title that was later called "PETER DUNN'S HORROR CABINET". Young obstetricians left the Hofburg in Vienna more or less frustrated and scared, as mainly negative aspects were discussed during 90 minutes in a way most of us considered even somewhat unfair, as figures and frequencies of such demonstrated disastrous happenings were completely omitted, while the benefits - with the exception of one short sentence - remained unmentioned. This is the reason why we do believe, that such an important topic needs at least spotlights from both directions, giving the auditorium an even change to make up their own minds about the benefits and hazards of continuous or intermittent feto-maternal monitoring.

To be fair to ourselves we want to recall, that in his opening remarks DUNN posed a few questions of great importance, that were unfortunately never discussed later on and deserve in my opinion to be thought about in a special Round-Table in the future. I have listed DUNN's questions as follows:

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| 1. Interferes monitoring with normal progress of labour? | 5. Are the therapeutic consequences always to the benefit of the patient? |
| 2. Causes monitoring anxiety and danger to mother and child? | 6. Does monitoring lead to neglect other aspects of maternity service? |
| 3. Is information of monitoring always accurate and reliable? | 7. Does monitoring lead to decline in clinical service? |
| 4. Do we interpret monitoring data always correctly? | 8. Can we identify all cases at risk to select a monitoring group? |

First we shall deal with the hazards of feto-maternal monitoring, either due to low amniotomy or due to the application of catheters and electrodes:

1. Loss of cervical dilatation by forewaters
2. Loss of isometric uterine contractions which protect utero-placental circulation
3. Loss of amniotic fluid protection of fetus and umbilical cord from compression
4. Loss of protection from ascending infection
5. Danger of umbilical cord prolapse
6. Danger of haemorrhage from low-lying placenta or velamentous umbilical vessels
7. Loss of amniotic fluid lubrication of birth canal during delivery
8. Increase of Type I Dips,
Increase of uterine contractions,
Increase of fetal head moulding
9. Haemorrhage by intrauterine catheter
10. Perforation of uterus
11. Scalp infections by FHR-electrode
12. Scalp infection by pH-electrodes
13. Avoiding of hazards by asking mother to lie on her back and not to move.

Now to some facts: Umbilical cord prolapse was seen twice in 14187 cases with internal CTG's, the frequency calculated is 0,1⁰/oo.

Bleeding due to the insertion of the intrauterine catheter was more frequently, 19 reported cases correspond to 1,8⁰/oo.

Perforation of the uterus has been reported once in 11508 cases.

Infections of fetal scalp wounds are more frequently caused by the spiral electrode than by the scalp blade and will occur more often, if more than one electrode has to be inserted and vaginal disinfection is neglected. However, not one single case in this material is reported, that led to severe complications of the newborn.

The most striking argument against feto-maternal monitoring by DUNN in Vienna was the avoiding of hazards by asking the mother to lie on her back and not to move. Such an argument is hard to understand as everybody knows, that one of the greatest advantages of internal cardiometry is, that the mother can stay in any position she prefers during labour.

Additional complications by monitoring detected on the newborn was a hematoma on the fetal scalp in 3 cases, corresponding to 0,3⁰/oo and one case of anemia of the newborn, where beside other factors cephal hematoma on the baby was diagnosed.

Rise of bilirubin levels in neonates delivered under Oxytocin infusion is statistical significant. However it does neither lead to jaundice nor any other complication (CALDER) and resolves spontaneously after a few days.

Osteomyelitis and sepsis were reported as rare complications in connection with fetal monitoring by OVERTURF, septic infection by HOHENAUER, which probably led to an abscess in the lungs. Another rare complication was liquorrhea as a cause of puncturing the great fontanel with a scalp electrode (GOODLIN) and a gonococcal sepsis was published as a cause of fetal monitoring by THADEPALLI.

Now we shall try to find out if there are benefits of feto-maternal monitoring.

One of the most important positive aspects in my view is the statement, that while a fetus is monitored, he must not die during labour. After seven years of monitoring up to 90% of our deliveries unfortunately we have learned from experience that this is not so. We recently saw a fetus die during stage II without being able to intervene. However, in the mentioned questionnaires we found that in a group not-monitored the fetal loss sub partu was nearly 8x higher than in the group monitored. The average perinatal mortality in 1978, the year the figures have been calculated from, was 12,8⁰/oo, ranging from 5,5 to 23,5⁰/oo. The not-monitored group figure was not available. Asked whether there was a decrease in perinatal mortality since monitoring was intensified, 14 centers answered the question as follows: Clinic 1 and 2 saw no change between the years before and 1978. We have to emphasize that in both hospitals perinatal care was excellent already before 1978. All others showed a decrease of perinatal mortality. There is no doubt that these figures have not only been achieved by monitoring alone, but also by improvement of prenatal care.

However, in a hospital, where prenatal care was sufficient more or less unchanged for many years, the increase of feto-maternal monitoring led to a decrease of perinatal mortality.

The following figures from a hospital in LINZ/Austria with an average delivery rate of 3500 are convincing:

YEAR	DELIVERIES	EXT.CTG	INT.CTG	MBU	PERINATAL
1974	2629	2,0%	3,6%	1,5%	1,93%
1975	2951	19,6%	15,8%	8,3%	2,06%
1976	2996	59,5%	25,9%	11,8%	1,70%
1977	3115	74,9%	33,5%	12,6%	1,63%
1978	3299	73%	36,4%	11,2%	1,15%

Similar results can be reported from my own department, where the figures of the first two years after new chairmanship introducing feto-maternal monitoring at a high rate and equal prenatal care quality showed a reduction of perinatal mortality of nearly 30%.

Raising the rate of feto-maternal monitoring from 76 to 93% did not change the operation frequency in our department significantly. As important as the mortality is the morbidity rate. Unfortunately we do not until now possess a commonly agreed definition of morbidity. So we asked participants in our study to give us data about severe acidosis or asphyxia expressed by umbilical cord pH lower than 7,10 and an APGAR-SCORE of 6 or less.

Out of 4375 cases before monitoring an average of 44,7⁰/oo concerning severe acidosis can be compared with 14,7⁰/oo after continuous monitoring, APGAR-SCORES lower than 6 could even be decreased from 33,8 to 6,5⁰/oo.

The figures I presented from 14 different hospitals demonstrate a decrease in perinatal mortality as well as perinatal morbidity, since feto-maternal monitoring was introduced or increased in these departments. What we still urgently need to answer the question, if feto-maternal monitoring is really an advantage, are exact figures and evaluation of perinatal morbidity in two groups of monitored and non-monitored deliveries. Especially the last group is increasing in the last two years, as the call for natural childbirth and home deliveries become more and more distinct.

APGAR-SCORING and scalp or umbilical cord blood sampling alone is not sufficient data to answer such an important question. Follow up studies of newborns in both groups including neurologic status as well as examinations of the psychologic and physic development of these children will be necessary.

There is also no question that reduction of perinatal mortality and morbidity was not only achieved alone by feto-maternal monitoring, but also by improvement of prenatal care, and as a believer in feto-maternal monitoring I do not deny, that excellent prenatal care is of very great importance to receive good results in the delivery room and post partum. But still to me this is not a question of alternatives; none of the two ways can be neglected in favour of the other, but both are fully necessary. The discussion about natural childbirth and home deliveries to me is absolutely academic. One of the main problems would be to decide, which delivery can take place at home and which has to be sent to a hospital.

We all know, that low risks as well as no risks can change immediately to high-risk cases during delivery for mother and child. After 20 years of obstetrical experience I still do not know, which case belongs to the 70%, that might be delivered naturally without exact observation. Therefore I still plea for monitoring every case entering the delivery room, as one of the most important advantages is to see the development of fetal distress soon enough and to draw consequences for the benefit of fetus or mother, which will succeed in a healthy child.

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