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Long-term follow-up for organic dysfunction in breech – presenting children

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A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

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Summary

Background: The authors performed a long term outcome analysis of minimal brain damage in children delivered in breech presentation, and related the results to the mode of delivery (vaginal or by cesarean section).

Material/Methods: In the Department of Obstetrics at the Medical University of Gdansk (Poland), 917 breech deliveries took place between 1981 and 1990. Excluding stillbirths and multiple pregnancies, 874 deliveries were analyzed. We received positive responses from 232 mothers, who provided us with considerable information about the children's further development and problems that had arisen during their school years. All the respondents were contacted by telephone, and 83 of them agreed to visit our Department with their children to undergo a psychological examination – the following tests were performed: 1) the Bender-Kopitz Test (BKT), and 2) the Benton Visual Retention Test (BVRT).

Results: The mode of delivery for all groups and subgroups had no influence on the incidence of organic brain disorders in later childhood, assessed by the Benton Visual Retention test and by the Bender-Kopitz test.

Conclusions: Vaginal breech deliveries are safe in both primiparous and multiparous mothers.

key words: **breech presentation • mode of delivery (vaginal or by cesarean section) • minimal brain damage in children • the Bender-Kopitz Test (BKT) • the Benton Visual Retention Test (BVRT)**

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Background

Although hundreds of thousands of papers on the topic can easily be found in computerized bibliographies, as well as in works from earlier times and obstetrical manuals published over the last two centuries, there is still no universally accepted way to manage breech delivery [1–8]. Even metaanalyses do not give a clear answer to the question as to which mode of delivery is better. A recent study by Hannah (Toronto) has proven that cesarean section (c-section) seems to be safer for the infant [5,9]. When weighing the pros and cons of c-section, however, one should be aware that these results may be due to the safety of low segment surgery and the safer anesthesia now available. On the other hand, the problem of the uterine scar has to be considered, especially in families that want to have more children. There have also been some suggestions that babies delivered by c-section more frequently suffer from respiratory problems [10].

Two radically different approaches to ceserean section become apparent among mothers. While some actually this kind of delivery, others regard it as a last resort, not only in view of possible complications for mother and child, but also because of the delayed return to professional activity as a results of surgical complications [11].

Our center participated in the Hannah study. However, our obstetricians are still not entirely convinced by the results. The last follow-up performed in this study was done at two years of age. The question may fairly be asked as to whether or not it suffices to do the follow-up at this age, since most babies are doing well at this time [9]. Some of them may be suffering from various kinds of damages that present only at a later age, and we do not know how they cope during the school years or in later life [6,12]. This was the main reason we decide to analyze our results by extending the follow-up study to late childhood. Thus a more precise tool had to be developed to achieve our goal.

The aim of our study was to assess the presence of signs of organic disorders, using psychological examination tools, in children delivered vaginally versus c-section, separately for primiparas and multiparas.

Material and Methods

In the Department of Obstetrics at the Medical University of Gdansk, 917 breech deliveries took place between 1981 and 1990. Excluding stillbirths and multiple pregnancies, 874 deliveries were analyzed. All the mothers in question received a questionnaire, sent to the address we found in the hospital records; they were asked to answer some questions and to indicate whether they might be interested in a follow-up psychological and neurological examination of their breech delivered child. We received positive responses from 232 mothers, who provided us with considerable information about the children's further development and problems that had arisen during their school years. These results have been published separately. All the respondents were contacted by telephone, and 83 of them agreed to visit our Department with their children to undergo a psychological examination. The tests and procedures were prepared and carried out under the supervision of Prof. Hanna Jaklewicz and Prof. Mariola Bidzan of the Institute of Psychology at Gdansk University. The ages of the children included in this study ranged from 9 to 18 years. The whole study was carried out with the consent of our University Bioethical Committee.

In this paper we analyze the results of psychological tests intended to assess the possibility of organic brain disorders that could have been due to the breech delivery. The following tests were performed:

- the Bender-Kopitz Test (BKT);
- the Benton Visual Retention Test (BVRT).

The BKT is a modified version of the Lauretta Bender Test, a familiar method for detecting organic brain damage in adult patients. The version used in our study was developed by Elisabeth Kopitz to examine children, in order to detect organic brain disorders. This method is useful in assessing children with learning difficulties. It is also used to investigate minimal brain dysfunction, the level of development of visuo-motor integration, and emotional disorders.

In order to classify the results as normal, almost normal, or pathological, we took into account the converted results. They were assessed on the basis of Polish norms, where a score between 0–90 is treated as relatively normal, 91–100 is borderline normal, and a score of 101 or higher indicates organic lesions of the central nervous system.

The BVRT is designed to assess visual perception and visual constructive abilities. It allows us to assess memory disorders, concentration disorders, and orientation and motor disorders in the case of many patients suffering from psychiatric and neurological disorders. The subject draws an image from memory immediately after having looked at it for 10 seconds, so that the test detects the abnormal decay of visual

Table 1. Benton Visual Retention Test (BVRT) results for all breech presentations in primiparas.

Mode of delivery	BVRT results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	27	90.0	3	10.0	30	100.0
C-section	21	87.5	3	12.5	24	100.0
Total	**48**	**88.9**	**6**	**11.1**	**54**	**100.0**

χ^2=0.084; p≥0.771.

Table 2. The Bender-Kopitz test results for all breech presentations in primiparas.

Mode of delivery	The Bender-Kopitz test results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal route	29	96.7	1	3.3	30	100.0
C-section	24	100.0	0	0.0	24	100.0
Total	**53**	**98.1**	**1**	**1.9**	**54**	**100.0**

χ^2=0.815; p≥0.367.

Table 3. Benton Visual Retention Test (BVRT) results in primiparas with the complete breech presentation at delivery.

Mode of delivery	BVRT results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	13	92.9	1	7.1	14	100.0
C-section	4	100.0	0	0.0	4	100.0
Total	**17**	**94.4**	**1**	**5.6**	**18**	**100.0**

χ^2=0.302; p≥0.582.

Table 4. The Bender-Kopitz test results in primiparas with the complete breech presentation at delivery.

Mode of delivery	Bender-Kopitz test results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	13	92.9	1	7.1	14	100.0
C-section	4	100.0	0	0.0	4	100.0
Total	**17**	**94.4**	**1**	**5.1**	**18**	**100.0**

χ^2=0.302; p≥0.582.

information. There are 10 images, each of which contains one or more figures (usually three). The results of the BVRT were assessed both on the basis of the number of mistakes made by the patent, and the number of correct representations. In both cases, depending on the level of the patient's intelligence and his age, both the expected number of mistakes and the expected number of correct representations were calculated on the basis of the instruction [3,13,14]. If the score obtained in our study in terms of the number of correct answers was 2 points lower than expected, this was treated as a result somewhere between normal and pathological. When the result was 3 points lower, it was treated as pathological. As for the number of mistakes made by the patient, the result was treated as a borderline when it was higher than expected by 3 points, while a result 4 points higher than expected was considered to be pathological.

The results were analyzed statistically using the χ^2 test, with the level of significance established at $p<0.05$.

Results

Since delivering for the first time is thought to have an impact on the prognosis in breech delivery, we analyzed the results separately for primiparas and multiparas. We analyzed each group as a whole and with respect to the presenting part, dividing each group into complete breech, frank breech and footling breech cases.

Results in primiparas

Psychological examination results in children delivered by primiparas irrespective of the type of breech presentation (Tables 1, 2)

Nearly 90% of children born by primiparas presented with no organic brain damage assessed by the BVRT. No influence of delivery route on the incidence of brain damage was found.

Table 5. Benton Visual Retention Test (BVRT) results in primiparas with the frank breech presentation at delivery.

Mode of delivery	BVRT results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	14	87.5	2	12.5	16	100.0
C-section	16	88.9	2	11.1	18	100.0
Total	**30**	**88.2**	**4**	**11.8**	**34**	**100.0**

χ^2=0.016; p≥0.900.

Table 6. The Bender-Kopitz test results in primiparas with the frank breech presentation at delivery.

Mode of delivery	Bender-Kopitz test results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	15	93.8	1	6.2	16	100.0
C-section	18	100.0	0	0.0	18	100.0
Total	**33**	**97.1**	**1**	**2.9**	**34**	**100.0**

χ^2=1.159; p≥0.282.

Table 7. Benton Visual Retention Test (BVRT) results for all breech presentations in multiparas.

Mode of delivery	BVRT results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	20	80.0	5	20.0	25	100.0
C-section	6	85.7	1	14.3	7	100.0
Total	**26**	**81.3**	**6**	**18.7**	**32**	**100.0**

χ^2=0.117; p≥0.732.

Table 8. The Bender-Kopitz test results for all breech presentations in multiparas.

Mode of delivery	Bender-Kopitz test results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	24	96.0	1	4.0	25	100.0
C-section	7	100.0	0	0.0	7	100.0
Total	**31**	**96.9**	**1**	**3.1**	**32**	**100.0**

χ^2=0.289; p≥0.591.

The BVRT results were found to be abnormal in 6 cases. Half of these (3 cases) were in the vaginal delivery group, and the other half in the c-section group. Only one abnormal result from the Bender-Kopitz test was noted in the vaginal

Table 9. Benton Visual Retention Test (BVRT) results in multiparas with the frank breech presentation at delivery.

Mode of delivery	BVRT results					
	Normal		Abnormal		Total	
	N	%	n	%	N	%
Vaginal	11	78.6	3	21.4	14	100.0
C-section	6	85.7	1	14.3	7	100.0
Total	**17**	**81.0**	**4**	**19.0**	**21**	**100.0**

χ^2=0.154; p≥0.694.

delivery group. Statistical analysis of results from both tests revealed no statistically significant differences between groups.

Psychological examination results in children delivered by primiparas with complete breech presentation (Tables 3, 4)

In only 1 child with complete breech at delivery did we find abnormal BVRT and Bender-Kopitz test results. No difference between mode of delivery groups was found in either test.

Psychological examination results in children delivered by primiparas with frank breech presentation (Tables 5, 6)

Abnormal BVRT results were found in 4 cases, 2 cases each in the vaginal delivery and c-section groups, with frank breech presentation at delivery. Only 1 abnormal Bender-Kopitz test result was found in the vaginal delivery group. Statistical analysis revealed no influence of the mode of delivery on the incidence of abnormal test results.

Psychological examination results in children delivered by primiparas with footling presentation

In all deliveries from the footling presentation at delivery in primiparas a c-section was performed, thus no statistical analysis could be carried out.

Although no statistical analysis was possible for the footling presentation in primiparas, we mention our results here to stress that abnormal results were also found in the c-section group. We may therefore safely assume that the protective value of the c-section is disputable.

Results in multiparas

Psychological examination results in children delivered by multiparas irrespective of the type of presenting breech (Table 7)

81.3% of babies born by multiparas from the breech presentation presented no signs of organic brain disorders as assessed by the Benton Test. Statistical analysis showed no influence of the mode of delivery on the incidence of brain damage in these children (Table 8).

Abnormal results from the Bender-Kopitz test were found In only one child born from the breech presentation. This child was born vaginally. Statistical analysis did not reveal any difference between the mode of delivery groups.

Psychological examination results in children delivered by multiparas with complete breech presentation

In the complete breech delivery group in multiparas, all the children were delivered vaginally. Thus no comparison of the mode of delivery was possible, and our results have only a purely informative function.

One 8-year-old child in this group had abnormal results on both tests (12.5%). Although comparative analysis was not possible, we can assume that most children born vaginally from complete breech presentation by multiparas presented no signs of organic brain disorders.

Psychological examination results in children delivered by multiparas with frank breech presentation (Table 9)

78.6% of the children born vaginally from frank breech by multiparas and 85.7% of those born by c-section presented no signs of brain damage in the Benton Visual Retention Test. Statistical analysis showed no significant differences between the two modes of delivery.

All children delivered from frank breech presentation by multiparas had normal results on the Bender-Kopitz test regardless of the mode of delivery.

The results presented above show no influence of the mode of delivery on the incidence of organic brain dysfunction in multiparas with frank breech presentation at delivery.

Psychological examination results in children delivered by multiparas with footling presentation

There were only 3 multiparas with footling presentation, all of whom delivered vaginally. We were unable to perform a comparison of the mode of delivery in this group. We present our results here for information only.

Even though we had no deliveries by c-section in this group, all results were found normal in the Bender-Kopitz test, and only 1 was abnormal in the Benton Visual Retention Test, so we can consider the vaginal mode for breech delivery to be a safe one. A normal result on the Bender-Kopitz test is an indirect indicator of a correct, or at least satisfactory level of development of visual perception and visual coordination.

Since many authors, e.g. Losiowski et al. [13], connect the score in the Apgar scale in the fifth minute of life with,

among other things, the level of psychomotor development and neurological status, this relation was also investigated in our research. No correlation was found between the number of points scored by a child on the Apgar scale and the results of the Benton test (r=–0.001, F=0.000025, p<0.996) or the Bender test (r=–0.206, F=2.084, p<0.156).

Discussion

Controversies surrounding breech deliveries have engaged many researchers and considerable financial resources [1,6,15]. A new approach to this subject was achieved by Mary Hannah in a multicentre study coordinated by the University of Toronto. The results achieved in this study have indicated that the c-section is safer for breech delivered babies, but there has been much discussion on its reliability [2,3,16–19]. Many obstetricians remained unconvinced generally, not due to other, contradictory results published afterwards, or doubts about the methodology, but usually on the basis of their own experience in breech deliveries. The idea of terminating each breech delivery by c-section has led to the loss of obstetrical skills among older obstetricians and the lack thereof in the younger practicioners. After many years of such a policy in obstetrics in the developed countries, nowadays, the lack of the requisite skill on the part of the physician has become yet another indication for doing a c-section routinely.

We decided to analyze our own data and to present them in the present study. Despite the general division into the group of primiparas and multiparas, each group of deliveries was analyzed in total and in subgroups of complete breech, frank breech and footling breech presentation. We were motivated to perform this study after the appearance of papers suggesting that babies delivered by c-section more often present respiratory disorders in comparison to those delivered vaginally [10].

In all groups and subgroups we found no influence of the mode of delivery on the incidence of organic brain disorders in later childhood, as assessed by the Benton Visual Retention Test and by the Bender-Kopitz test. It should be emphasized, however, that not every brain damage results in a worse mastery of the visual – memory tasks measured by the Benton Visual Retention Test and by the Bender-Kopitz test. Many factors come into play, including the size, kind and location of the damage and its persistence. It is also worth pointing out that mistakes in the drawing tests are connected first of all with the dysfunction of the posterior (occipital, parietal and temporal) lobes. This results in difficulties in so called organic tests, which could be a genuine indicator confirming organic brain dysfunction; nevertheless, the lack of such difficulties cannot be the basis for excluding organic brain damage.

These tests are recognized for this evaluation worldwide. We found no similar or such long term analyses in the literature. Thus we cannot compare our results to others. These children also underwent examination for neurological and other psychological disorders for other studies, and no differences between groups were found.

Some researchers have investigated the relation between the number of points on the Apgar scale and intellectual- cognitive functioning in early childhood. The results obtained so far have not been unequivocal. It should nevertheless be stressed that methods of assessing infants are not definite prognosticators of the eventual intellectual level, if they are considered in separation from other risk factors [20,21.

Conclusions

The vaginal route is a safe method of delivery in breech presentations in both primiparas and multiparas.

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