Obstetrics; Maternal-Fetal Medicine and Perinatology

An Obstetrics Index for the Assessment of Risk Levels of "High Risk Pregnancy" Groups

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ABSTRACT

OBJECTIVE: To validate the usability of "Beksaç Obstetrics Index" (BOI/BOIp) in the evaluation of different high risk pregnancy groups.

STUDY DESIGN: This study is consisted of 3 groups of patients; 1) Pregnancies without MTHFR polymorphisms (n=65), 2) Pregnancies with methylenetetrahydrofolate reductase (MTHFR; homozygous or compound heterozygous) polymorphisms (n=140), 3) Pregnancies with "autoimmune antibody positivity" without any other type of hereditary thrombophilia (Anti-dsDNA, anti-phospholipid Ig G/M, anti-cardiolipin Ig G/M, ASMA, APA, ENA, anti-mitochondrial antibodies) (n=76). In this study, BOI which is (number of child +π/10)/Gravida is used in order to demonstrate the risk levels/scale of different high risk pregnancy groups.

RESULTS: The mean BOIp (±SD) values are 0,41±0,22; 0,29±0,21; and 0,40±0,23 for Control, MTHFR and Autoimmune groups respectively. We have demonstrated statistically significantly decreased BOIp level in MTHFR group compared to the other groups (p:0,002).

CONCLUSION: We have demonstrated that BOI/BOIp can be used in the assessment of risk levels of different high risk pregnancy groups.

Keywords: Perinatal morbidity & mortality, High risk pregnancy, Beksac obstetrics index

Introduction

The goal of perinatal medicine and antenatal care program is to reduce perinatal morbidity and mortality as much as possible considering maternal comfort and medico-legal issues.[1-2] In clinical practice, we are dealing with wide spectrum of patients with various health disorders causing different perinatal complications.[3-6] The critical issue is the existence of multiple variables behind the maternal health disorders and perinatal complications. This reality makes life difficult for physicians in the categorization and comparison of risk levels/scales for different patient groups.

In this paper, we have introduced a new approach for the evaluation of "risk levels" in high risk pregnancy patient

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groups going together with different type of perinatal complications considering the reality of having wide spectrum of variables affecting targeted patient groups.

Material and Method

In this paper, we have decided to use an obstetric index which is (number of child +π /10)/Gravida, heretofore named "Beksac Obstetrics Index" (BOI). This approach enables us to create "BOI/BOIp curves" on a scale with BOI/BOIp index based "Y" axis and gravida based "X" axis. These curves will provide us visual and possibly mathematical comparisons of the patient groups of interest (Figure 1). This approach can be used during pregnancy (BOIp) and after delivery (BOI) for different high risk pregnancy groups. BOI calculation is not recommended before the completion of neonatal period (postpartum 28th day). In this study BOIp is used for the comparison of risk levels of study groups.

This study is consisted of 3 groups of patients; 1) Pregnancies without MTHFR polymorphisms (n=65), 2) Pregnancies with methylenetetrahydrofolate reductase (MTHFR; homozygous or compound heterozygous) polymorphisms (n=140), 3) Pregnancies with "autoimmune antibody positivity" without any other type of hereditary thrombophilia (Anti-dsDNA, anti-phospholipid Ig G/M, anti-cardiolipin Ig G/M, ASMA, APA, ENA, anti-mitochondrial antibodies)

(n=76). In this study, we have selected 3 unrelated "patient groups" to demonstrate the usability of BOIp. The purpose of the setting is not to compare groups in term of different medical variables/parameters or in clinical means.

In this study, Hacettepe University Perinatal Medicine Data Base is used for the extraction of patient groups (2002-2014).

Results

A total number of 218 patients were enrolled in the study and were divided into three groups. The study group is consisted of patients without MTHFR polymorphisms (Control Group; n=65), patients with methylenetetrahydrofolate reductase polymorphisms (MTHFR Group; n=140), and patients with "autoimmune antibody positivity" without any other type of hereditary thrombophilia (Autoimmune Group; n=76). Maternal demographic characteristics did not vary significantly in the three groups of patients. Table 1 shows the demographical features of the study groups.

The mean BOIp (±SD) values are 0, 41±0, 22; 0, 29±0,21; and 0,40±0,23 for Control, MTHFR and Autoimmune groups respectively. BOIp of MTHFR group is statistically significantly lower compaired to the other 2 groups. Details are given at table 2 and 3.

This statistical significance arises from differences between Group 1 to 2 and Group 2 to 3 (p: 0,002). Table 3 and figure 1 summarize the Bonferroni Post-Hoc test results in the three groups.

Discussion

In this study, we have introduced a new approach for the evaluation of "risk levels" of various high risk pregnancy groups with perinatal complications. BOI/BOIp will enable physicians to categorize and compare different high risk pregnancy groups with different medical backgrounds and variables. BOI/BOIp can be calculated or applied both during the course of current pregnancy (BOIp) or after the delivery (BOI) for different purposes. BOIp and BOI evaluations may also enable physicians to compare "treatment modalities".

It has also been reported that "higher placental weight relative to birthweight" can be used in the evaluation of intrauterine hypoxia and fetal growth.[7] We believe that this type of new approaches like ours' will give support to physicians in clinical evaluations.

Generally, different patients groups are compared in terms of perinatal morbidity/mortality with limited parameters/variables retrospectively by using APGAR score, cord blood gas analysis and acid-base measurements, birthweight, gestational week at delivery etc.[8-10] We believe that BOIp is especially profitable during pregnancy and critical for the planning/envisioning of the management of risk factors. On the other hand its' additional role cannot be ignored for the retrospective evaluations.

In this study, we have demonstrated the usability of BOIp for the comparison of risk levels of different patient groups such as patients with hereditary thrombophilia (MTHFR homozygote/compound heterozygote mutations) and patients with autoimmune antibody positivity. It has been reported that MHFR polymorphisms and hyperhomocysteinemia may cause adverse pregnancy outcome and fetal complications.[8-9] Adverse effect of autoimmune disorders on pregnancy outcome is also widely accepted[10]. In this study, we have used these 2 clinical models in order to show the usability of BOIp in clinical practice. We have shown that BOIp is statistically significantly lower in MTHFR group compared to other groups (p: 0,002). Table 2/3 and Figure 1 show the BOIp values and BOIp curves respectively. Our "autoimmune group" is actually not consisted of patients with autoimmune disorders but patients with autoimmune antibody positivity. This may be the reason of having control group like BOIp results.

Table 1: Demographical features of the study groups

Groups	Control (n: 65) Mean+-SD	MTHFR (n: 140) Mean +-SD	Autoimmune (n: 76) Mean+-SD	p value
Maternal age (years)	30.9±4.8	31.3±4.8	32.8±4.9	0.055
Gravida	2.7±1.9	2.9±1.6	2.9±1.4	0.513
Parity	0.9±0.8	0.8±0.9	0.9±0.7	0.604

Table 2: Comparison of the groups in terms of BOIp

Groups	n	Mean	Standard Deviation	95% Confidence Interval for Mean		Minimum	Maximum	*p value*
				Lower Bound	Upper Bound			
Control	65	0.43	0.22	0.36	0.47	0.06	0.77	**0.000**
MTHFR	140	0.29	0.22	0.26	0.33	0.03	0.77	
Autoimmune	76	0.41	0.23	0.36	0.46	0.04	0.83	

Table 3: BOIp analysis for specific pairs of groups (Bonferroni Post-Hoc Test)

Groups		Mean Difference	Standard Error	Significance	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	MTHFR	0.11769*	0.03345	**0.002**	0.0371	0.1983
	Autoimmune	0.00832	0.03765	1.000	-0.0824	0.0990
MTHFR	Control	-0.11769*	0.03345	**0.002**	-0.1983	-0.0371
	Autoimmune	-0.10937*	0.03175	**0.002**	-0.1859	-0.0329
Autoimmune	Control	-0.00832	0.03765	1.000	-0.0990	0.0824
	MTHFR	0.10937*	0.03175	**0.002**	0.0329	0.1859

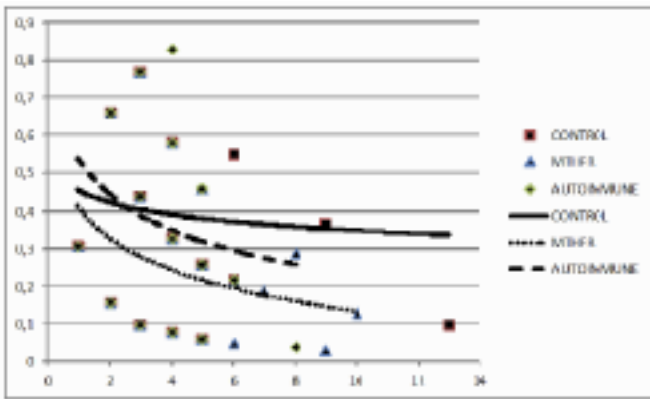** The mean difference is significant at the 0.05 level.*

Figure 1: "Beksaç Obstetrics Index" (BOIp) curves of different patient groups (Group 1:Control; Group 2: MTHFR; Group 3: Autoimmune).

We have demonstrated that BOI and BOIp can be used in composing risk scale/degree of different high risk pregnancy groups. We also believe that this type of new approaches will enable obstetricians more free in clinical evaluations.

Conclusion

This is the first study comparing different patient groups during pregnancy with a lately introduced index. We believe that BOI/BOIp is an effective alternative approach for the risk assessment and perinatal surveillance.

Yüksek Riskli Gebelik Gruplarının Değerlendirilmesi için Bir Obstetrik İndeks

ÖZET

AMAÇ: Farklı yüksek riskli gebelik gruplarının değerlendirilmesinde "Beksaç Obstetrik İndeksi (BOİ/BOİp)"nin kullanılabilirliğinin değerlendirilmesi.

GEREÇ VE YÖNTEM: Bu çalışma 3 grup hastadan oluştu. Grup 1 kontrol hastalarını (n=65), Grup 2 MTHFR enzimi için homozigot veya compound heterozigot mutasyonu olan hastaları (n=140), Grup 3 ise otoantikor pozitifliği olan (Anti-dsDNA, anti-fosfolipid Ig G/M, anti-kardiolipin Ig G/M, ASMA, APA, ENA, anti-mitokondrial antikor varlığı bulunan) ancak herhangi bir herediter trombofilisi bulunmayan hastaları (n=76) içermekteydi. Bu çalışmada (Yaşayan çocuk sayısı+π/10)/Gravida olarak tanımlanan BOİ farklı yüksek riskli gebelik gruplarında olumsuz klinik durumları göstermek için kullanıldı.

BULGULAR: Ortalama BOİp değerleri (±SD) kontrol grubunda 0,41±0,22, MTHFR polimorfizm grubunda 0,29±0,21 ve otoantikor grubunda 0,40±0,23 idi. İstatistiksel anlamlılık MTHFR polimorfizmi grubu ile diğer gruplar arasındaki farktan kaynaklanmaktaydı (p=0,002).

SONUÇ: Farklı yüksek riskli gebelik gruplarında risk düzeyinin değerlendirilmesinde kullanılabileceğini gösterdik.

Anahtar Kelimeler: Perinatal morbidite ve mortalite, Yüksek riskli gebelik, Beksaç obstetrik indeks

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