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产前超声诊断结果与胎儿先天性心脏病结局的相关性及危险因素分析*

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摘要 目的:对比先天性心脏病胎儿与正常胎儿的产前超声差异,分析产前超声诊断结果与胎儿先天性心脏病的相关性及危险因素。**方法:**选取我院 2018 年 12 月到 2020 年 12 月共收治的 80 例有先天性心脏病胎儿的孕妇作为研究对象,将其分为观察组,另选取健康胎儿的 80 例孕妇进行对比研究,将其分为对照组,对所有孕妇进行彩色多普勒超声进行诊断,分析观察组超声诊断与最终结果,对比两组胎儿的超声诊断情况,并对孕期胎儿先天性心脏病的风险因素进行单因素与多因素 logistic 回归分析。**结果:**通过尸检和出生后随访最终确定结果与超声诊断结果对比无显著差异($P>0.05$),超声诊断中有 3 例漏诊;由于卵圆孔直径大于 6 mm、心内膜垫缺损(Endocardial cushion defect, ECD)和单心房胎儿没有正常的四腔心结构,因此无法进行腔室内径的测量,对其他观察组患儿进行测量之后发现,观察组患儿左心发育不全综合征(hypoplastic left heart syndrome, HLHS)的左心房与左心室、法洛氏三联症(Tetralogy of Fallot, TOF)右心室、室间隔缺损(Ventricular Septal Defect, VSD)右心室内径明显低于对照组($P<0.05$);对可能造成胎儿先天性心脏病的高风险因素进行分析发现,两组孕妇的孕期早期服药、高龄产妇以及家族心脏病史情况对比差异显著,观察组明显更高($P<0.05$);对所有因素进行赋值,其中"是"或"有"为 1, "否"或"无"为 0。通过 logistic 回归分析发现只有孕期早期服药和家族心脏病史为胎儿先天性心脏病的独立危险因素($P<0.05$)。**结论:**对孕妇进行综合产前超声诊断胎儿先天性心脏病的准确率较高,与最终结果无明显区别;虽然高龄孕妇与胎儿先天性心脏病具有一定关系,但是只有孕期早期服药和家族心脏病史是胎儿先天性心脏病的独立危险因素。

关键词:先天性心脏病;产前超声;危险因素;高龄孕妇;多普勒超声

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Correlation and Risk Factors Analysis of Prenatal Ultrasound Diagnosis Results and Fetal Congenital Heart Disease Outcomes*

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ABSTRACT Objective: To compare the difference of ultrasound examination between the fetus with congenital heart disease and the normal fetus, and to analyze the correlation and risk factors between the results of prenatal ultrasound diagnosis and fetal congenital heart disease. **Methods:** 80 cases of pregnant women with congenital heart disease in our hospital from December 2018 to December 2020 were selected as the research object, and they were divided into the observation group, another 80 cases of pregnant women with healthy fetus were selected for comparative study, and they were divided into the control group, all pregnant women were diagnosed by color Doppler ultrasound, the ultrasonic diagnosis and final results of the observation group were analyzed, and the differences between the two groups were compared. The risk factors of fetal congenital heart disease during pregnancy were analyzed by univariate and multivariate logistic regression. **Results:** There was no significant difference between the results determined by autopsy and postnatal follow-up and the results of ultrasound diagnosis ($P>0.05$), and there were 3 cases of missed diagnosis in ultrasound diagnosis. There was no normal four chamber structure in the fetuses with HLHS, ECD and single atrium, so it was impossible to measure the inner diameter of the chambers. After measuring other children in the observation group, it was found that the inner diameters of the left atrium and left ventricle, TOF right ventricle and VSD right ventricle in the observation group were significantly lower than those in the control group ($P<0.05$). There were significant differences in early pregnancy medication, elderly women and family history of heart disease between the two groups, and the observation group was significantly higher ($P<0.05$); all factors were assigned values, in which "yes" or "yes" was 1, and "no" or "no" was 0. Logistic regression analysis showed that only taking medicine in early pregnancy and family history of heart disease were independent risk factors of fetal congenital heart disease ($P<0.05$). **Conclusion:** The accuracy of comprehensive ultrasound examination for pregnant women in the diagnosis of fetal congenital heart disease is high, and there is no significant difference with the final result; Although there is a certain relationship between elderly pregnant women and fetal congenital heart disease, only early medi-

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cation during pregnancy and family history of heart disease are independent risk factors of fetal congenital heart disease.

Key words: Congenital heart disease; Ultrasound examination; Risk factors; Elderly pregnant women; Doppler ultrasound

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前言

先天性心脏病是胎儿期常见的疾病之一,属于一种结构异常现象,可在母体之中形成,同时也是导致新生儿死亡的一个重要原因^[1]。已有相关研究数据显示^[2,3],在我国每年都有 15 万左右的新生儿出生之后患有先天性心脏病,我国胎儿先心病的数量在总出生的婴儿数量中可达 8%到 12%,发病率高,但治疗效果不理想,对于胎儿正常的生长与发育造成严重影响。胎儿先天性心脏病大多数属于复合畸形,应用常规超声诊断并不能够清楚地显示出畸形的血管与心脏等组织,所以临床上的误诊率与漏诊率比较高^[4]。随着影像学技术的发展,彩色多普勒超声技术逐渐可以清晰地显示出胎儿血管血流信号情况,对于胎儿先天性心脏病筛查具有重要价值^[5,6]。相关研究显示^[7,8]临床上具有胎儿先天性心脏病高危因素的产妇,要着重对产妇进行产前超声,检测先天性心脏病情况。本文选取我院 2018 年 12 月到

2020 年 12 月共收治的 80 例有先天性心脏病胎儿的孕妇作为研究对象,对产前超声在胎儿先天性心脏病中的应用价值与先天性心脏病相关因素进行分析确定。

1 资料与方法

1.1 一般资料

选取我院 2018.12 到 ~2020.12 共收治的 80 例有先天性心脏病胎儿的孕妇作为研究对象,将其分为观察组,另选取健康胎儿的 80 例孕妇进行对比研究,将其分为对照组。纳入标准:观察组孕妇通过尸检与产后随访确诊为胎儿先天性心脏病^[9];对照组产妇新生儿出生后无心脏异常现象;所有孕妇知情同意本研究;本研究经西北妇女儿童医院伦理委员会批准。排除标准:胎儿羊水过少者;孕妇腹壁过厚者;不配合研究者;胎儿位置固定者。两组一般资料如表 1 所示。

表 1 一般资料
Table 1 General Information

Groups	n	Age (years)	Check when the gestational week (weeks)	Production times (times)	Whether the initial production	
					Yes	No
Observation group	80	26.54± 8.31	23.46± 2.10	1.48± 0.24	31	49
Control group	80	25.46± 6.10	23.52± 2.24	1.52± 0.11	35	45
χ^2/t	-	0.937	0.175	1.355	0.413	
P	-	0.350	0.861	0.177	0.521	

1.2 方法

常规产前超声:在常规超声进行先天性心脏病筛查过程中,应用美国 GE Voluson E10 四维彩超仪,将探头频率设置为 2.5 到 4.0 赫兹,并在检查之前为孕妇讲解检查的要点内容,提升孕妇检查配合度,首先让孕妇保持平卧位,将腹部区域暴露,随后利用超声探头对孕妇的腹部斜切面、纵切面以及横切面等多个切面进行扫查,在扫查过程中要关注胎儿的心脏、面部、头部以及胸部的发育情况,评价胎儿的双顶径、腹围以及胸围等数据,并对超声结果进行综合评判,最后发出诊断结果^[10,11]。

心脏产前超声:应用美国 GE Voluson E8 型多普勒彩色超声诊断系统,将探头频率设置为 2.5 到 5.5 赫兹。让孕妇保持仰卧位,上述产前超声已经明确了胎儿的形态、大小与位置,因此在上述基础上需要对胎儿的心脏情况进行评价,其中主要包含四腔心、左室流出道、右室流出道、三血管、主动脉弓、动脉导管弓切面等进行检查,观察上述位置有无一样情况,并观察胎儿有无发育异常和血流异常等^[12]。

对所有孕妇的临床资料进行分析,并对孕妇进行问卷调查,调查孕妇孕期出现的先天性心脏病可能影响因素及疾病史,并进行总结分析。

1.3 统计学方法

本研究采取 SPSS 23.0 进行数据分析,计数资料以(n/%)表示,进行 χ^2 检验;计量资料以($\bar{x} \pm s$)表示,组间比较采用 t 检验;采用 logistic 回归分析胎儿先天性心脏病结局的高危因素;以 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 观察组胎儿超声诊断结果与最终结局对比

通过尸检和出生后随访最终确定结果与超声诊断结果对比无显著差异($P > 0.05$),超声诊断中有 3 例漏诊,如表 2 所示。

2.2 两组胎儿心脏部分腔室内径数值对比分析

由于卵圆孔直径大于 6 mm、ECD 和单心房胎儿没有正常的四腔心结构,因此无法进行腔室内径的测量,对其他观察组患儿进行测量之后发现,观察组患儿 HLHS 的左心房与左心室、TOF 右心室、VSD 右心室内径明显低于对照组 ($P < 0.05$),如表 3 所示。

2.3 胎儿先天性心脏病单因素分析

对可能造成胎儿先天性心脏病的高风险因素进行分析发现,两组孕妇的孕期早期服药、高龄产妇以及家族心脏病史情况对比差异显著,观察组明显更高($P < 0.05$),如表 4 所示。

表 2 观察组胎儿超声诊断结果及最终结局的比较(n)

Table 2 Comparison of fetal ultrasound diagnosis results and final outcomes in the observation group (n)

Diagnostic results	n	HLHS	Monatrial	Complete ECD	TOF	Oval hole diameter greater than 6 mm	VSD	Total
Ultrasonic diagnosis	80	3	5	7	14	17	31	77
Final outcome	80	4	6	8	14	17	31	80
χ^2	-	-	-	-	-	-	-	3.057
<i>P</i>	-	-	-	-	-	-	-	0.245

表 3 两组胎儿心脏部分腔室内径比较(mm)

Table 3 Comparison of partial chamber diameter of fetal heart between the two groups(mm)

Groups	n	HLHS(n=3)		TOF(n=14)	VSD(n=31)
		Left ventricle	Left atrium	Right ventricle	Right ventricle
Observation group	80	4.34± 1.45	4.31± 1.64	6.53± 2.02	7.04± 1.48
Control group	80	7.21± 1.68	8.45± 1.36	8.17± 2.24	9.96± 1.53
t	-	11.567	17.380	4.863	12.269
<i>P</i>	-	<0.001	<0.001	<0.001	<0.001

表 4 胎儿先天性心脏病的单因素分析(n)

Table 4 Single factor analysis of fetal congenital heart disease(n)

Category	Observation group(n=80)	Control group(n=80)	χ^2	<i>P</i>
Aged puerpera				
yes	17	5	7.589	0.006
no	63	75		
Early pregnancy medication				
yes	21	7	8.485	0.004
no	59	73		
Family history of heart disease				
yes	7	1	4.737	0.030
no	73	79		
Extracardiac malformation of pregnant women				
yes	4	1	1.858	0.173
no	76	79		
History of adverse pregnancy				
yes	7	5	0.360	0.548
no	73	75		
Teratogenic exposure history				
yes	4	2	0.693	0.405
no	76	78		
Abortion history				
yes	3	2	0.206	0.650
no	77	78		
History of early pregnancy fever				
yes	7	5	0.360	0.548
no	73	75		

2.4 多因素 logistic 回归分析

对所有因素进行赋值,其中"是"或"有"为1,"否"或"无"为0。通过 logistic 回归分析发现只有孕期早期服药和家族

心脏病史为胎儿先天性心脏病的独立危险因素 ($P<0.05$),如表 5 所示。

表 5 多变量逻辑回归分析
Table 5 Multivariate logistic regression analysis

Factor	Parameter estimate	Standard error	Wald	P	OR	95% CI
Aged puerpera	0.431	0.034	5.314	0.118	1.431	0.754~2.435
Early pregnancy medication	0.463	0.096	8.096	0.023	2.546	1.364~3.475
Family history of heart disease	0.457	0.089	8.145	0.030	2.458	1.359~3.257
Extracardiac malformation of pregnant women	0.546	0.035	4.541	0.213	2.546	1.461~3.732
History of adverse pregnancy	0.335	0.108	10.484	0.108	0.464	0.210~1.347
Teratogenic exposure history	0.464	0.105	8.484	0.216	2.774	1.876~4.010
Abortion history	0.447	0.304	6.274	0.134	0.747	0.314~1.249
History of early pregnancy fever	0.543	0.143	3.547	0.221	1.547	0.583~2.542

3 讨论

对于有先天性心脏病的患者来说,由于出生之前心脏结构就出现了异常情况,因此会影响到患者正常的血流动力学,从而导致患者出现缺血或者缺氧等问题,增加了心脏负担,加深了心律失常风险^[13,14]。因此对孕妇胎儿进行先天性心脏病筛查,并结合实际超声报告进行经皮穿刺技术治疗,而且也可以在胎儿出生后,利用针对性的治疗方法持续治疗^[15]。对于通过产前超声发现先天性心脏病不严重的胎儿,可进行保守治疗,严重者则需考虑应用引产终止妊娠,因此,先天性心脏病早期的筛查与诊断对提升新生儿的出生质量至关重要^[16,17]。当前超声是先天性心脏病胎儿筛查的重要方法,然而常规超声由于影响因素比较多,所以存在着很多不足之处,例如产妇过于肥胖、检查时间太短以及检查者的工作经验等,容易出现漏检现象^[18]。随着影像学技术的发展,越来越多医疗学者更倾向于应用彩色多普勒超声技术对胎儿进行先天性心脏病筛查,它与常规超声相比探头的分辨率更高,而且检查的速度更快,确保了影像清晰度,具有无创性,避免对新生儿和孕妇产生不良影响^[19,20]。

本研究结果表明,通过尸检和出生后随访最终确定结果与超声诊断结果对比无显著差异($P>0.05$),超声诊断中有 3 例漏诊,由此证明,对于孕妇应用超声进行先天性心脏病筛查准确率较高,因为通过彩色多普勒超声可以从四腔心、左室流出道、右室流出道、三血管、主动脉弓、动脉导管弓切面等不同切面对心脏进行筛查,能够使大部分的心脏畸形在产前就得到准确的诊断,结合相关研究^[21-23]可知:应用常规超声只能对先天性心脏病进行最基本的筛查,想要更准确的筛查还需要进行多切面诊断,与本研究相符。由于卵圆孔直径大于 6 mm、ECD 和单心房胎儿没有正常的四腔心结构,因此无法进行腔室内径的

测量,对其他观察组患儿进行测量之后发现,观察组患儿 HLHS 的左心房与左心室、TOF 右心室、VSD 右心室内径明显低于对照组($P<0.05$),Sethi N^[24]和黄杏玲^[25]相关研究显示:正常胎儿与心脏异常胎儿心脏腔室的大小存在差异,结合本研究可知:应用彩色多普勒超声能够观察到胎儿的各室内径,与正常胎儿对比之后可以筛查心脏畸形,并对其严重程度进行判断。本研究对可能造成胎儿先天性心脏病的高风险因素进行分析发现,两组孕妇的孕期早期服药、高龄产妇以及家族心脏病史情况对比差异显著,观察组明显更高($P<0.05$),表明:以上因素均为导致先天性心脏病的相关影响因素,而前人研究发现^[26-28],孕早期使用抗生素、被动吸烟以及妊娠期合并症情况与胎儿先天性心脏病有着明显关系,但是本研究中只发现孕期早期服药、高龄产妇以及家族心脏病史情况与胎儿先天性心脏病有关,与相关研究具有一定差异,因此还需后续研究中扩大研究基数进行深入研究。另外,本研究通过 logistic 回归分析发现只有孕期早期服药和家族心脏病史为胎儿先天性心脏病的独立危险因素($P<0.05$),由此证明,孕期早期服药和家族心脏病史的孕妇胎儿出现先天性心脏病的概率比较高,因此在实际工作中,要对孕期早期服药和家族心脏病史的孕妇加强监测,进行有效的孕期保健,重视畸形筛查,改善产妇的不良妊娠结局情况^[29,30]。

综上所述,对孕妇进行综合产前超声诊断胎儿先天性心脏病的准确率较高,与最终结果无明显区别;虽然高龄孕妇与胎儿先天性心脏病具有一定关系,但是只有孕期早期服药和家族心脏病史是胎儿先天性心脏病的独立危险因素。

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