Possibility of fetal evaluation by measuring an energy of a blood flow of umbilical vessels

(Object)We tested a usefulness of measuring energy of blood flow both sides of an umbilical vessel's for the fetal evaluation

(Method)The basic equation is that non-stationary and incompressible viscous fluid flowing in a cylindrical tube for energy measurement of intravenous blood flow. Introducing a Reynolds number and a frequency parameter yielded that the basic equation is resulted in an equation of a stationary and compressive viscous fluid flowing in the cylindrical tube. Blood in addition to a presumed body weight of fetuses and Amniotic Fluid Index (AFI) was measure for 22 pregnant women 22 to 40 weeks after pregnancy 35 times in total by using Toshiba SSA340(Convex type PVF375dt 3.75MHz)

(Results) For an energy change of 5.0×10^{-6} Kcal/Kg, no IUGR was observed and the volume of amniotic fluid was normal. Three cases ,of which energy change was under 5.0×10^{-6} Kcal/Kg and energy change ratio was under 0.3, showed IUGR, AFI<5, and Tocolysis failure.

(Conclusion)(1)A fetus can be evaluated by measuring the energy of a blood flow of an umbilical artery and a vein.

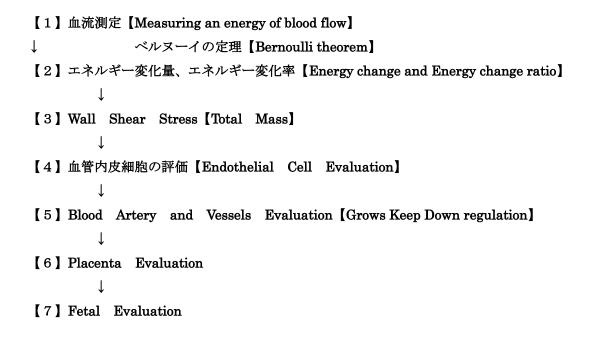
(2)The fetus evaluation by measuring the energy of blood flow of an umbilical artery and vein requires two aspects of examination, and, thus, appears to be possible to evaluate more accurately in comparison with the conventional method using only one aspect of examination.

臍帯動静脈血流エネルギー測定による胎児評価の可能性

周産期管理における胎児評価法は多岐にわたる。その中でも超音波検査は非侵襲的で、得られる情報量が比較的多く、 胎児モニタリングと並び胎児管理の中心となっている。しかし胎児の血流測度による胎児評価は、Umbilical Artery Resisutannce Index 【UA-RI】等に代表されるように、特異度が高い反面、敏感度 が低いことから僅かな症例を除き日常診断に用いられることは比較的少ない。日常診断に用いる指標をめざし、臍帯血 流動静脈両端の血流エネルギー損失量と損失率測定を 2000 例行い、明らかな有用性を確認した。この測定は漢方にお いては、胎盤内の於血、血虚の評価であると考えられる。胎児評価法としては精度が日々進化しています。

Key words: Umbilical Artery Resistance Index (UA-RI), Blood flow,
Fetal evaluation, Umbilical vessels energy, Reynolds number,
Wellbeing or not, 血虚 於血 胎児評価 血流測定 流体力学
漢方 分娩開始

流れ図



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