

## 5. SUMMARY AND CONCLUSION

The present study evaluates the diagnostic capacity of Doppler sonography of the uterine arteries as a screening method in a low risk study group. Examinations were performed as part of an anomaly scan between 20 and 23 weeks of gestation.

Ultrasonic examinations were performed between the 1<sup>st</sup> of January 1993 and the 31<sup>st</sup> of August 2000 at a non-university ambulant office serving as a referral centre for more than 200 gynaecologists. Each examination was performed under standardized criteria with an ACUSON XP 10 or an ACUSON SEQUOIA (ACUSON, Mountain View, CA, USA). Out of 8,244 pregnant women that had been examined, a study population of 7,502 women was available for evaluation. Multiple pregnancies and those complicated by lethal abnormalities, as well as those terminated prior to 25 weeks of gestation, were excluded.

Outcome variables of the study were IUGR (incidence 3.89%), pre-eclampsia (incidence 0.68%), placental abruptio (incidence 0.35%), IUD / NND (incidence 0.27%), preterm delivery (<37 weeks - incidence 4.51%, < 33 weeks – incidence 1.25%, < 29 weeks – incidence 0.41%) and the occurrence of any of these problems. With an incidence of 8.33% for any of these complications including preterm delivery < 37 weeks (<33 weeks – incidence 5.57%, < 29 weeks – incidence 5.09%) the study group fulfilled the criteria for a “low risk” population.

The diagnostic capacity of MEAN PI, MIN PI and MAX PI as well as 4 different definitions for pathological wave forms, were compared.

There was a relatively small difference between the diagnostic capacity of MEAN PI, MIN PI, and MAX PI with a slight advantage for MEAN PI.

The application of “Combination 1” (bilateral notch and MEAN PI > P50 or unilateral notch and MEAN PI > P 90 or no notch and MEAN PI > P 95), resulted in:

- a sensitivity for pre-eclampsia of 54.9% with a specificity of 93.4%
- a sensitivity for placental abruption of 42.3% with a specificity of 93.2%
- a sensitivity for IUGR of 31.2% with a specificity of 94%
- a sensitivity for IUD / NND of 20% with a specificity of 93.1%
- a sensitivity for preterm delivery <33 weeks of 41.5% with a specificity of 93.5% and
- a sensitivity for “any problem” (including preterm delivery <33 weeks) of 31.1% with a specificity of 94.5%.

The use of unilateral or bilateral notching alone, elevated impedance alone or “Combination 2” (bilateral notch or unilateral notch and MEAN PI > P50 or no notch and MEAN PI > P90) yielded less favourable results.

In summary, the findings of this study would seem to suggest that DSUA may be helpful in identifying women at risk for major pregnancy complications like pre-eclampsia, placental abruption and placental insufficiency resulting in intrauterine growth restriction or even intrauterine death.

In light of these findings, it would appear there is only little ethical or medical justification to perform prospective randomised studies which exclude pregnant women – especially nulliparae - from the beneficial effect of an early prediction of some of the most relevant pregnancy complications which threaten the health of the fetus, the mother, or both. DSUA should be made available to the patient to improve the management and outcome of pregnancy.

There are still some open questions:

- First, can subgroups be defined that are at very low risk according to anamnestic data and the present situation, and therefore must not necessarily be offered DSUA?

- Second, can cases be identified inside the group with pathological uterine artery waveform that are at very high risk for severe, acute (placental abruption) and early (<33 weeks) complication?

The presented data clearly indicate the importance of the DSUA as a part of anomaly screening which should be extended to all pregnant women and not only to a small group which is believed to be at elevated risk, for any reason. There is prima facie evidence that every woman is at risk for any problem and that it is the responsibility of the practitioner to offer tried and tested technology, to identify those women that do not need extensive care. Doppler sonography has been shown to be most effective for fetal echocardiography and for malformation screening. Since DSUA has been applied as part of anomaly scanning including high-quality fetal echocardiography and since these results have been obtained by experienced sonographers with high quality equipment, it is not sure whether these results are reproducible in normal gynaecological offices.