FETAL MEDICINE IN A LOW RESOURCE SETTING

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Challenges

A good Fetal Medicine service is based on a good routine ultrasound service.

Challenges in South Africa

- Insufficient funding for ultrasound equipment
- Insufficient trained personnel
- Patients booking late
- Patients unable to travel to centres for ultrasound

Benefit of obstetric ultrasound service in low resource setting

- Introduction of an ultrasound service to two rural Rwandan hospitals.
- 9 week training program with lectures and hands-on
- American residents were trainers. Trained local people for ongoing training.
- After the 9 week period, local providers continued using the same system of scanning and documentation.
- Recorded whether the ultrasound had changed their management.
- Blind review of the data sheets.

Results

- 44% were obstetric scans
- Management was changed in 43% of cases
- Most common change in management plan was to perform a surgical procedure after the ultrasound. Most common surgical procedure was a caesarean section.
- Unexpected findings of breech presentation, placenta praevia, multiple pregnancy,etc.
- Quality and accuracy of the scans : 96% accuracy when reviewed
- Sustainability : 1 year post study, the number of scans done by Rwandan physicians was double that done during the training period. Maintenance of equipment would need to be addressed.

Shah et al BMC International Health and Human Rights 2009,**9** : 4

Possible solutions to the resource issues

- Portable ultrasound machines
- Sonographers at community sites
- Accelerated training programmes
- Training of sonographers, midwives and medical officers in rural areas
- Telemedicine

Benefits of routine ultrasound in South Africa

- No improvement in perinatal mortality, BUT
- Better gestational age estimation
- Decreased inductions for postdatism
- Earlier detection of multiple pregnancies
- **Earlier detection of fetal abnormalities**
  - **ALLOWS PREPARATION OF PATIENT**
  - **ALLOWS MEDICAL STAFF TO INTERVENE APPROPRIATELY**
  - **BETTER TIMING OF SCREENING TESTS**

FETAL MEDICINE

- Fetal development
- Genetics
- Fetal abnormalities
- Diagnostic testing
- Fetal therapy
- Perinatal pathology
- Neonatology
- Preterm labour
- Impaired placentation
- Maternal and fetal physiology
- Infections
- Multiple pregnancy
- Ethics
- Research methodology
- Organisation of a Fetal Medicine Unit

Fetal Medicine

- Screening for chromosomal and structural abnormalities
- Fetal therapies and procedures

Screening for chromosomal abnormalities

- In South Africa, diseases such as pre-eclampsia, preterm labour and infection account for most of the perinatal mortality.
- However,chromosomal abnormalities occur equally in affluent and low income countries.
- Because of poor resources for care of disabled children, this causes considerable social burden. Additionally, health care costs for these children are high.
- Down syndrome is the commonest cause of intellectual disability in SA and is also often associated with physical health problems, e.g. congenital heart disease.

Down syndrome detection

2008 audit of public sector cytogenetics laboratories nationally (6 labs)

	PRENATAL	POST-NATAL
Down syndrome	61 (8%)	660
Trisomy 18	48 (36%)	87
Trisomy 13	15 (19%)	65

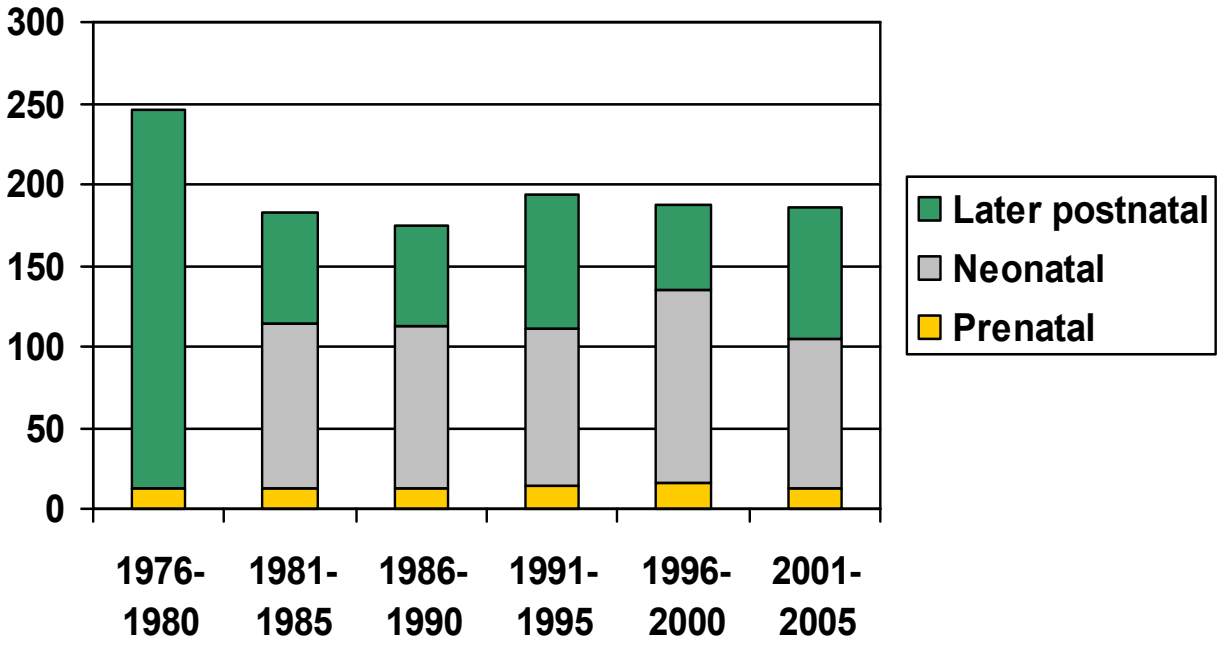
(Urban M 2010)

3 year audit of Tygerberg Hospital Cytogenetics laboratory

	PRENATAL	POSTNATAL
All aneuploidy	46 (33.8%)	90

(Geerts L 2009)

Trend in prenatal vs postnatal diagnosis of Down syndrome Metro West



Reasons for low number of prenatal diagnoses

- Most patients identified for referral are those of advanced maternal age (AMA)
  - Late booking (57% of women >37 years of age booked after 20 weeks – small audit at one Cape MOU)
    - Transport costs
    - Lack of child care
    - Lack of knowledge of importance of antenatal care
    - Unwelcoming medical facilities
  - Misunderstandings about referral criteria
  - Poor compliance of primary health care staff to existing protocols of referral
  - Many patients present initially not to antenatal clinics, but to other primary care facilities (Day Hospitals, G.Ps), who do not refer them timeously

Reasons for low number of prenatal diagnoses

- Uptake of amniocentesis

UCT FMU 2008 – 2009: 785 women 37 yrs and older

329 offered karyotyping

126 accepted (37%)

(4 T21 , 2 T13, 8 T18 6 Other)

Reasons for low uptake of amniocentesis 145 pts

94 (66%) would not consider TOP

50 (34%) felt they would accept the condition

34(23%) religious beliefs

14(10%) fear of miscarriage

Concurs with data on acceptance of TOPs for serious conditions of 44%

Reasons for low number of prenatal diagnoses

- Screening programme

Traditionally women of advanced maternal age (AMA) have been counselled as high risk and offered amniocentesis.

Most units offer to 37 years and older.

Detection rate with this method is 30%.

Need a screening method which screens all women

Need a better screening method for AMA women

Screening for chromosomal abnormalities

Audit data from public sector cytogenetic laboratories for 2008

TOTAL SAMPLES n = 1212 (100%)

- Advanced maternal age 529 (57% of those with known indication)
- Screening test 266 (29%)
- Fetal anomaly on US 136 (15%)

Screening for chromosomal abnormalities

- Comparison between AMA related screening and ultrasound based risk adjustment (Geerts L Int. J Gynaecol Obstet 2008)
- Retrospective review over 3 years looking at ultrasound markers/anomalies and karyotype abnormalities
- Ultrasound based risk adjustment has a higher sensitivity than screening by maternal age alone (93.9% vs 44% for all autosomal trisomies and 93.1% vs 43.8% for T21)
- Most of the ultrasounds were 2nd trimester (marker/anomaly scans)

Screening for chromosomal abnormalities - what to aim for

- In all women who book early enough – NT scan 68% DR
- Biochemistry not available in state sector
- In high risk – karyotyping (1:200 cut-off)
- In addition, offer marker/anomaly scan at 18-23 weeks
- Adjust risk according to markers
- Women over 40 years may be offered counselling and karyotyping irrespective of risk assessment

Late bookers

- Women who book too late for NT scan are offered a marker scan at 18-23 weeks and risk assessed according to this.
- This includes women >37 years.

Screening programme

- Ultrasound based risk reduction rather than maternal age screening
- In a resource poor setting this provides high sensitivity and screening efficiency, though may be small decrease in detection rate
- Wider screening net rather than small group of women only
- Reduced karyotyping with reduced procedure related losses and decreased costs
- Need cost analysis to see whether this saving may offset the costs of a routine ultrasound service.

Fetal therapies – fetal transfusions and laser for TTTS

- Confined to few centres
- Low incidence of severe Rhesus isoimmunisation in SA
- Challenges around equipment for laser treatment
- Few trained personnel
- ? One specialised centre in the country
- Procedures such as bladder drainage, shunts for chylothorax can be done

Fetocide

- National figures from 6 Fetal Medicine units 2007
- 59 fetocides per year (6 – 25)
- Mostly done for lethal trisomies, severe brain pathology, severe skeletal dysplasias, multiple abnormalities
- Of note is that these units are mainly in Western Cape, Gauteng, Kwa-Zulu Natal and Free State
- Leaves large parts of the country uncovered
    - Patel 2007

Resource constraints and fetocide

- What happens in the rest of the country?
- Are children with serious abnormalities all born?
- Do people take things into their own hands?
  - Bleeding cord at caesarean section
  - Injecting KCl into the cord/heart as the baby is delivered
  - Turning fetus to breech and do unmonitored, unassisted delivery
- Ethics

Conclusions

- Benefits of a routine ultrasound service in a low resource setting
- Challenges to providing a service
- Fetal Medicine issues around screening for abnormalities
- Difficulties with fetal medicine procedures
- Possible ways forward

Finally

In a country where resources are constrained, we have to practice in the most cost effective ways.

We need to prioritise what the budgets should be spent on and motivate for these.

Should we spend money on screening for pre-eclampsia or increasing the NT program or progesterone to prevent preterm labour.

- All competing demands and these are also in competition with other demands such as ARV programs, improving contraceptive access.
- We need to make very careful decisions about what we should prioritise.