Trends in State/population-based screening for Neural Tube Defects (NTDs), South Australia 1986-2004

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Abstract

Objective:
To review changes in the utilization and effectiveness of state/population-based antenatal screening for NTDs in South Australia (population 1.54 million) from 1986-2004 (average of 19,029 births per year, 611 total NTDs).
Methods:
Trends in utilization of antenatal screening and detection rates for NTDs in South Australia 1986-2004 were assessed in a retrospective observational population-based study. Data on maternal serum alpha-feto protein (MSAFP) screening were obtained from the only two laboratories in the State that offer MSAFP screening for NTDs (the South Australian Maternal Serum Antenatal Screening (SAMSAS) Program and a private laboratory), and on all births and terminations of pregnancy with NTDs from the South Australian Birth Defects Register and the Pregnancy Outcome Unit of the South Australian Department of Health.. We evaluated trends in utilization of screening and rates of antenatal detection using chi-square tests for trend.
Results:
Utilization of MSAFP screening increased from 73.9% of confinements in 1986 to 88.5% in 1991 and then decreased significantly to 37.6% in 2004 (p<0.0001), while the utilization of antenatal ultrasound remained over 92% during this period. The decrease in MSAFP screening coincided with the introduction of first trimester combined Down syndrome screening in South Australia in 2000.There was a significant increase in the rate of antenatal detection of NTDs from 76.3% in 1986 to 95.2% in 2004 (p<0.0001) and the sensitivity of screening also increased significantly from 85.8% in 1986-1991 to 95.1% in 1999-2004 (p=0.001).
Conclusion:
Despite a significant decrease in the utilization of MSAFP screening, the population-based detection of NTDs and screening sensitivity has increased significantly in South Australia. This suggests an improved sensitivity and clinician confidence in second trimester ultrasound for the detection of NTDs.

Background

- 90% of all children born with Neural Tube defects (NTDs) have no maternal risk factors
- Routine antenatal screening for detection of all NTDs
  - MSAFP 85% [1]
  - Ultrasound 81% [2]
- Routine antenatal screening for detection of spina bifida
  - MSAFP 65-74% [2,3]
  - Ultrasound 60-71% [2,3]
- Antenatal screening for detection of all NTDs in High Risk women is greater than that seen in routine screening
  - Ultrasound 97% [3,4]
- Historical events in South Australia on NTD screening (1986-2004)
  - 1986 - State-wide second trimester maternal serum screening for NTDs introduced
  - 1994-95 - State-wide educational drive on the benefits of Folic Acid supplementation for the reduction of NTDs
  - 1995/96 - State-wide emphasis on ultrasound for the detection of NTDs based on prior poor prenatal detection [3]
  - 2000 - State-wide introduction of first trimester combined Down syndrome screening

Objective

- To review changes in the utilization and effectiveness of state/population-based antenatal screening for NTDs in South Australia from 1986 to 2004.

Materials and Methods

- Retrospective observational population-based audit for trends in antenatal screening and detection rates of NTDs in South Australia from 1986 to 2004
- Data obtained from:
  - South Australian Maternal Serum Antenatal Screening Program (SAMSAS), Women's and Children's Hospital
  - South Australian Birth Defects Register, Department of Health
  - Pregnancy Outcome Unit, Department of Health
- Data reviewed
  - Utilization of second trimester MSAFP screening (% of confinements)
  - Utilization of first trimester combined Down syndrome screening since 2000 (% of confinements)
  - Birth or terminations of pregnancy with NTDs
  - Overall antenatal detection rate of NTDs (women screened and not screened)
  - Sensitivity of screening for NTDs (screening includes MSAFP or Ultrasound)
- Data analysis
  - Chi-square test for trends

Results

- Average of 19,029 births per year from 1986 to 2004
- 611 total number of births or terminations with NTDs
- Utilization of second trimester MSAFP screening increased from 73.9% of confinements in 1986 to 88.5% in 1991, but decreased significantly to 37.6% in 2004. (Figure 1)
- This decrease in MSAFP screening coincided with the introduction of first trimester combined down syndrome screening in 2000 (Figure 1)
- There was a significant increase in the rate of overall antenatal detection of NTDs from 76.3% in 1986 to 95.2% in 2004 (Table 1)
- The sensitivity of screening for NTDs showed a significant increase from 85.8% in 1986-1991 to 95% in 1999-2004 (Table 1)

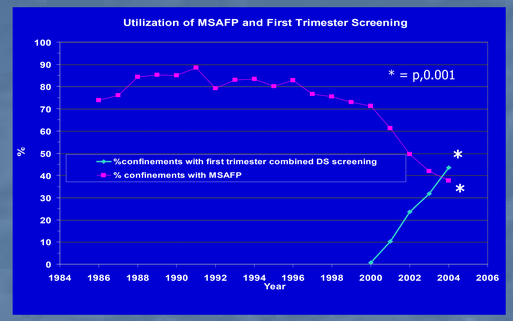

Figure 1. Utilization of MSAFP and first trimester combined DS screening

Year	Average births/Yr (#)	Average NTDs/Yr (#)	Utilization MSAFP (%)	Overall antenatal detection (%)	
1986-91	19,714	41	82.2	86	* = p,0.001
1992-98	19,437	32	80.2	88.8	
1999-2004	17,867	24	49.8 *	94.5 *	

Table 1. Average births per year, NTDs per year, utilization of MSAFP and overall detection of NTDs over three time periods.

Conclusion

- Utilization of second trimester MSAFP screening showed a significant decrease with the introduction of first trimester combined Down syndrome screening
- The detection of NTDs through a state-based screening program showed a steady improvement from 1986 to 2004
- This improvement continued after 2000, despite the decreased utilization of MSAFP screening
- This improved detection of suggests improved sensitivity of routine ultrasound screening for NTDs
- The decreased utilization of second trimester MSAFP represents improve clinician confidence in second trimester ultrasound for the detection of NTDs

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