Meta-analysis of AMOR-IPAT Studies: evidence of very strong associations between the regular use of preventive labor induction and improved birth outcomes

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ABSTRACT

OBJECTIVE: To combine the results of all published data concerning the Active Management of Risk in Pregnancy at Term (AMOR-IPAT) so as to assess the strength of association between rates of common adverse birth outcomes and exposure of parturients to the regular use of preventive term labor induction. **FINDINGS:** Over the past six years the AMOR-IPAT Research Program has developed four different databases. All AMOR-IPAT publications have reported significant improvements in birth health following the regular use of risk-based preventive labor induction within the term period of pregnancy. After combining these studies, the induction of labor rate in AMOR-IPAT exposed parturients (n=1153) was 39.1% as compared to 20.4% in non-exposed parturients (n=1865) ($p < 0.0001$). The cesarean delivery rate in exposed parturients was 5.7% as compared to 14.4% in the non-exposed parturient group ($p < 0.0001$). NICU admission rate was also lower(3.0% vs. 6.6%, $p = 0.0000$) and Adverse Outcome Index (AOI) scores were also lower (1.8 vs. 6.2, $p < 0.001$) in the AMOR-IPAT group. No adverse birth outcomes occurred with increased frequency in the AMOR-IPAT group. **CONCLUSIONS:** The regular use of risk-based preventive labor induction probably has a significant positive impact on the birth health of populations. By lowering cesarean delivery rates, AMOR-IPAT may also have a significant impact on future birth health as well. Further study of AMOR-IPAT with prospective randomized design is definitively needed, and governmental funding to support such research is clearly indicated.

BACKGROUND

Rates of cesarean delivery are increasing in Australia, in New Zealand, in the USA and throughout the world. Rates of other adverse birth outcomes, including neonatal intensive care unit (NICU) admission and maternal mortality, are increasing as well.

Unfortunately, methods to safely lower rates of cesarean delivery and other adverse outcomes do not appear to be forthcoming.

However, optimal birth outcomes appear to result when delivery occurs 1-2 weeks *prior* to the EDC according to a considerable body of recently published literature (i.e., Caughey et al, Nicholson et al).

THE BASIC UNDERLYING PROBLEMS: 1) 60% of nulliparous women and 40% of multiparous women will not develop spontaneous labor until after their EDC (when rates of adverse birth outcomes are higher), and 2) Maternal risk profiles are worsening (higher maternal age, greater maternal weight, higher rates of gestational diabetes and higher rates of chronic hypertension).

THE POTENTIAL SOLUTION: The regular use of risk-based prostaglandin-assisted preventive labor induction to ensure that all women enter labor with a ripened cervix during their estimated optimal time of delivery - which is often in the 38th or 39th week of gestation. According to AMOR-IPAT theory, the greater a gravida's degree of composite risk, the earlier in the term period she should be delivered (so that labor is more likely to occur before the fetus gets too large for the maternal pelvis, and before the placenta becomes too old to support the fetus during labor).

METHODS

META-ANALYSIS OF THE FOUR PUBLISHED DATABASES INVOLVING AMOR-IPAT

- List major findings from each published AMOR-IPAT Study
- Combine the data to further assess the association between AMOR-IPAT exposure and rates of various adverse birth outcomes
- Adjust for potential confounding elements within the composite database

RESULTS

First Database: Annals Family Med "Rural" Study - 2007

	IOL* (%)	Cesarean (%)	3rd/4th (%)	NICU (%)	AOI Score**
AMOR-IPAT (n=794)	31.4%	5.3%	8.1%	2.3%	-
Standard Care (n=1075)	20.4% ****	11.8% ****	9.5%	4.2% ***	-

Second Database: AJOG "Urban NULLIP" Study - 2009

	IOL* (%)	Cesarean (%)	3rd/4th (%)	NICU (%)	AOI Score**
AMOR-IPAT (n=100)	48.0%	9.0%	7.0%	5.0%	3.1
Standard Care (n=352)	23.6% ****	25.8% ****	12.5%	11.9% ***	6.3 ***

Third Database: AJOG "Urban MULTIP" Study - 2009

	IOL* (%)	Cesarean (%)	3rd/4th (%)	NICU (%)	AOI Score**
AMOR-IPAT (n=123)	61.0%	0.8%	0%	7.3%	4.1
Standard Care (n=304)	16.4% ****	9.9% ***	4.3% ***	8.6%	4.9

Fourth Study: AJOG "HUP-POP" RCT Study - 2008

	IOL* (%)	Cesarean (%)	3rd/4th (%)	NICU (%)	AOI Score**
AMOR-IPAT (n=136)	58.0%	10.3%	3.7%	1.5%	1.4
Standard Care (n=134)	21.6% ****	13.9%	1.5%	6.7% ***	8.6 ***

ALL STUDIES – The Combined Data

	IOL* (%)	Cesarean (%)	3rd/4th (%)	NICU (%)	AOI Score**
AMOR-IPAT (n=1153)	39.1%	5.7%	6.6%	3.0%	1.8
Standard Care (n=1867)	20.4% *****	14.4% *****	8.6% ***	6.6% *****	6.2 ****

* IOL: Induction of labor; ** AOI Score: Adverse Outcome Index Score;
***p <0.05, ****p <0.001, *****p<0.0001

Note: reprints of all AMOR-IPAT papers, the full AMOR-IPAT bibliography, the AMOR-IPAT risk scoring sheet and a summary of the AMOR-IPAT method of care are available at this poster station

RESULTS

The association between AMOR-IPAT exposure and low cesarean delivery rate remained highly statistically significant following adjustment for maternal age, race, alcohol abuse, and epidural use. For AMOR-IPAT exposure, the final logistic regression model revealed: OR 0.39, 95% CI [0.31-0.51], $p < 0.0001$.

CONCLUSIONS

In this compilation of data, the regular use of risk-based prostaglandin-assisted preventive labor induction in pregnancy at term was highly associated with lower rates of cesarean delivery, lower rates of NICU admission and lower AOI scores. The rates of all other adverse birth outcomes were either unchanged or lower in the AMOR-IPAT exposed group. Accordingly, AMOR-IPAT may represent a strategy that can safely lower rates of cesarean delivery while improving other birth outcomes.

IMPLICATIONS / FUTURE DIRECTIONS

1. The regular use of risk-based preventive labor induction may enable the safe reduction of cesarean delivery rates, NICU admission rates, and Adverse Outcome Index scores.
2. The use of AMOR-IPAT should be immediately considered for adoption in additional experimental settings.
3. The impact of the regular use of preventive labor induction on birth outcomes needs to be formally studied within the context of multi-site adequately powered randomized clinical trials (RCTs).