

singleton pregnancy were identified. BMI was calculated based on pre-surgery weight and pre-pregnancy weight, and then used to identify 4 control patients (two matched for pre-surgery BMI, two matched for pre-pregnancy BMI) within 3 BMI points and 5 years of age. The primary outcomes were the rates of gestational diabetes or hypertensive disorders of pregnancy. Secondary outcomes included various neonatal outcomes: gestational age, birth weight, perinatal morbidity and mortality.

**RESULTS:** There was a significant decrease in rate of gestational diabetes (GDM) in bariatric surgery patients as compared to both control groups ( $p < 0.01$ ). There was no significant difference in the rate of hypertensive disorders of pregnancy compared to both control groups. Rates of post-partum hemorrhage were lower after bariatric surgery (both  $p < 0.05$ ). Additionally, neonates born to bariatric surgery patients were statistically smaller than those born to both BMI control groups ( $p < 0.001$ ), with a significant reduction in macrosomia ( $p < 0.01$ ), and an increase in SGA infants ( $p < 0.05$ ). An increased rate of stillbirth in the bariatric surgery group was noted as well.

**CONCLUSION:** Bariatric surgery is associated with reduction in GDM in a subsequent pregnancy, as compared with both pre-surgery BMI and pre-pregnancy BMI matched controls, but perhaps at the expense of increased neonatal morbidity.

**Table:** Delivery Outcomes and Neonatal Outcomes of Pregnant Patients who have undergone Bariatric Surgery Compared to BMI-Matched Controls

Characteristics	Control Group A <sup>a</sup> (n=140)	<i>p</i> <sup>c</sup>	Cases <sup>b</sup> (n=70)	<i>p</i> <sup>d</sup>	Control Group B <sup>e</sup> (n=140)
Gestational age (wks)	39.1	0.34	39.0	0.03	39.2
Preeclampsia <sup>1</sup>	15 (10.7)	0.65	6 (8.6)	0.99	12 (8.6)
Gestational hypertension <sup>1</sup>	18 (14.3)	0.12	4 (6.6)	0.50	13 (9.7)
Total hypertension <sup>1</sup>	33 (21.5)	0.12	10 (14.3)	0.53	25 (17.9)
Gestational diabetes <sup>2</sup>	21 (15.0)	<0.001	0 (0.0)	0.01	13 (9.3)
GDM or hypertension <sup>3</sup>	51 (37.2)	0.001	10 (14.3)	0.03	38 (27.1)
Mean birth weight (g)	3463	<0.001	2951	<0.001	3351
Perinatal mortality	1 (0.7)	0.09	4 (5.7)	0.01	0 (0.0)

Data are n (%) unless otherwise specified.

<sup>1</sup>Bariatric surgery patients with a subsequent pregnancy.

<sup>2</sup>Pregnant patients with a pre-pregnancy BMI matched to the BMI of the bariatric surgery patients before they surgery.

<sup>3</sup>Pregnant patients with a pre-pregnancy BMI matched to the BMI of the bariatric surgery patients before they became pregnant.

<sup>4</sup>Comparison of bariatric surgery patients to Control Group A.

<sup>5</sup>Comparison of bariatric surgery patients to Control Group B.

<sup>6</sup>Adjusted for history of preexisting chronic hypertension.

<sup>7</sup>Adjusted for history of preexisting diabetes.

<sup>8</sup>Adjusted for history of preexisting chronic hypertension and diabetes.

### 323 Preoperative intravascular balloon catheters and surgical outcomes in pregnancies complicated by placenta accreta—a management paradox

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**OBJECTIVE:** To examine the impact of preoperatively placed intravascular balloon catheters in pregnancies complicated by placenta accreta.

**STUDY DESIGN:** Retrospective study of pregnancies with pathology proven placenta accreta from 1990-2011.

**RESULTS:** A total of 117 cases with pathology-proven placenta accreta were reviewed. Fifty-nine subjects (50.4%) diagnosed prenatally with accreta had preoperative balloon catheters placed. Estimated blood loss was significantly lower in the group with preoperative balloon placement compared to those without balloons (2.2 L vs 2.8 L respectively,  $p < 0.02$ ). Balloons were deployed intraoperatively in thirty of the fifty-nine subjects (51%). The decision to deploy the balloons was left to the operating surgeon, and in 29/30 cases anticipated or ongoing severe hemorrhage was the indication for deployment. Balloon deployment was associated with significantly greater blood loss (2.7L

vs. 1.7L,  $P = 0.001$ ) and greater transfusion volumes (5.7u vs. 3.4u PRBCs respectively,  $P = 0.02$ ). Two patients (3.3%) had balloon-related complications: one developed a femoral artery thrombus requiring thrombectomy and one developed a catheter site hematoma that was managed expectantly without further event.

**CONCLUSION:** Preoperative placement of balloon catheters was associated with overall reduced total blood loss. However, in cases where the balloons were deployed intraoperatively, blood loss and transfusion volumes were greater than in those without deployment. This paradox is likely the consequence of the balloons being deployed only in the setting of impending or actual catastrophic hemorrhage. Further studies with rigid protocol-driven use of balloon catheters are needed to address their true utility. To date, this study represents one of the largest series of cases with pathology-proven accreta in which preoperative intravascular balloon placement was routinely utilized.

### 324 Longitudinal study of sleep disordered breathing (SDB) in pregnancy

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**OBJECTIVE:** Evaluate SDB in the 2nd and 3rd trimesters (TM) using the validated Berlin Questionnaire (BQ) and assess maternal characteristics potentially predictive of SDB.

**STUDY DESIGN:** Healthy women with normal pregnancies, entering obstetric care Jan, 2010 - Jan, 2011 were recruited to undergo SDB risk assessment. The BQ has 3 sections: (1) snoring severity, (2) fatigue severity and (3) chronic hypertension or a BMI > 30 kg/m<sup>2</sup>. High risk for SDB is present if at least 2 of 3 sections are scored abnormal. Assessments were made in the early 2nd and 3rd TMs. Potential predictors for SDB, included age, parity, race/ethnicity, neck circumference, BMI, weight gain, gestational diabetes, Mallampati tongue position score (0-4) and Friedman tonsil size score (1-4).

**RESULTS:** Of 499 consenting women the mean age was 23 y, 53% were multiparous, 81% were African American, and the mean BMI was 29 kg/m<sup>2</sup>. Their initial evaluation was at a mean (SD) gestational age (GA) of 15.7 (4.3) wks, and 463 (93%) returned at a mean GA of 30.0 (1.0) wks. Initial neck circumference (mean=13.4), tonsil size score (mean=1.25) and Mallampati score (mean=2.57) did not change significantly between the 2nd and 3rd TMs. The overall prevalence of high risk for SDB in the 2nd TM was 34%, which increased to 40% in the 3rd TM. In univariate analyses, multiparity, BMI, age, and neck circumference were all significant predictors of 2nd TM high-risk BQ; multiparity, BMI, age, neck circumference, tonsil size and Mallampati score were significant predictors of 3rd TM high-risk BQ. However, in multivariable analyses, only BMI ( $p < 0.0001$ ) and multiparity ( $p = 0.03$ ) significantly predicted the 2nd TM high-risk BQ, while BMI ( $p < 0.0001$ ) was the sole independent predictor of the 3rd TM high-risk BQ.

**CONCLUSION:** High-risk for SDB is common in an obstetric population with a mean BMI of 29 kg/m<sup>2</sup> and increases over gestation. Of the predictors assessed, BMI had by the far the strongest association. In multivariable analyses, controlling for BMI, and parity, other predictors for SDB, were not significantly associated with a high-risk BQ.

### 325 Risk of preterm birth and low birth weight in women with congenital heart disease

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**OBJECTIVE:** Due to advances in cardiac care, the number of adults living with congenital heart disease (CHD) is increasing. Women with

CHD who become pregnant face a specialized set of challenges and an increased risk of adverse outcome. Risk factors associated with adverse obstetrical and neonatal outcomes are incompletely understood. The primary aim of this study was to determine what cardiac risk factors are associated with preterm birth (PTB) and low birth weight (LBW).

**STUDY DESIGN:** A retrospective cohort study examined outcomes in women with CHD who delivered between 1998-2010. We collected maternal cardiac, obstetrical, neonatal and echocardiographic data for analysis. The rates of adverse obstetrical and neonatal outcomes were determined and baseline cardiac characteristics were examined using Fishers exact test to assess the strength of association with adverse outcomes.

**RESULTS:** The study included 64 women with CHD (1 mild, 45 moderate, 22 complex heart defects) who had a total of 68 pregnancies. Only 29 women had preconception cardiac evaluation at an adult congenital heart disease center. An adverse obstetrical or neonatal outcome occurred in 41.1% (n=28) of pregnancies and included any of the following: PTB, LBW, pre-eclampsia, preterm rupture of membranes, or hemorrhage. The rate of PTB was 36.7% (n=25) and LBW was 27.9% (n=19). Factors associated with sustaining a PTB or LBW included the need for cardiac medications prior to pregnancy, moderate/severe tricuspid valve regurgitation, and moderate to severe right ventricular dysfunction (p≤0.05). The rate of cesarean delivery was 50.7%.

**CONCLUSION:** A significant number of women with CHD undergoing pregnancy will experience an adverse obstetrical or neonatal outcome. Right heart failure, as evidenced by moderate to severe RV dysfunction and/or moderate to severe tricuspid valve regurgitation is associated with an increased risk of PTB and LBW. A larger cohort is needed to confirm these findings. Given the high rate of adverse outcomes, women with CHD should be cautioned about fetal as well as maternal cardiac risks associated with pregnancy.

**326 Mode of delivery after previous cesarean section in the Netherlands**

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**OBJECTIVE:** The SIMPLE study (Cesarean Section IMPLementation), studies the implementation of current guidelines for cesarean section (CS) in the Netherlands: both current care and facilitators and barriers for optimal care. An important group with increasing CS rates is pregnant women with a previous CS. We evaluated the current patterns in choices of mode of delivery in women who were eligible for a trial of labor (TOL) in the Netherlands.

**STUDY DESIGN:** We performed a secondary analysis on a Dutch retrospective cohort. This cohort included women who were eligible for a TOL and gave birth in 2010. Data were collected in 17 hospitals, with a good representation of all Dutch regions and hospital types. In the participating hospitals, 30 cases of TOL and all repeat CSs in the same time-interval were included. We recorded data which was considered

relevant for the chance on a vaginal birth after previous cesarean (VBAC). Primary outcome measures were: current percentage TOL and VBAC per hospital, and the differences between women opting for TOL or repeat CS.

**RESULTS:** Medical records of 9,833 patients were reviewed, 1,068 patients had a history of CS (10.9%) of whom 757 (70.9%) were eligible for TOL. The TOL rate ranged from 44% to 93% (68.9% 12.1%), the VBAC rate ranged from 50% to 90% (72.4% 10.9%). Women who chose for a TOL over a repeat CS had in general a more favorable prognostic profile for achieving VBAC. However, a trend was observed that hospitals with a higher TOL rate had a higher VBAC rate, indicating that the chance of successful VBAC is currently not adequately estimated, but that local obstetric policy plays a more important role.

**CONCLUSION:** In 2010, in the Netherlands, the majority of women opted for a TOL after previous CS. National data on uterine rupture shows an annual incidence of about 30 cases in 175,000 deliveries [1]. In the group of women with a TOL, this is 0.3%. The benefits of VBAC outweigh these small numbers of serious morbidity, but identification of women who have a very low chance of success is needed. Reference [1] PRN: "Perinatal Care in the Netherlands 2005" Utrecht 2008.

**327 Higher rates of secondary caesarean sections and assisted vaginal deliveries per hospital do not improve perinatal outcome**

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**OBJECTIVE:** Secondary Caesarean sections and instrumental deliveries are performed for failure of progress of labour or for suspected fetal distress. One would hypothesize that a high intervention rate during labour would result in optimal fetal outcome. In this study, we assessed whether higher rates of secondary caesarean sections and assisted vaginal deliveries per hospital are related to an improved perinatal outcome.

**STUDY DESIGN:** We studied the deliveries of all nulliparous women with term, singleton, cephalic pregnancies, carrying a living fetus without congenital abnormalities at the start of delivery in all 98 Dutch hospitals from January 2005 to December 2007. Data were obtained from the Dutch Perinatal Registry. This registry contains the linked and validated data of the national obstetric database for gynaecologists and the national neonatal/paediatric database. For each hospital, total intervention rates (which included secondary caesarean sections and assisted vaginal deliveries) for the indications suspected fetal distress or dystocia, were correlated to adverse perinatal outcome rates, defined as intrapartum mortality, apgar score <7 and/or NICU admission) using the Pearson's correlation coefficient.

**RESULTS:** We studied 258,676 deliveries. The total intervention rates per hospital ranged from 23% to 55%. No significant correlation was found between total intervention rates and adverse perinatal outcome per hospital (Fig.1, r = -0.171, p = 0.093). Also the rates of interventions made solely for the indication fetal distress were not significantly correlated to adverse perinatal outcome (r = +0.174, p = 0.086). Interestingly, higher intervention rates for the indication dystocia per hospital were significantly related to lower perinatal adverse outcome rates (r = -0.236, p = 0.019).

**CONCLUSION:** There appears to be a wide variety in rates of secondary caesarean sections and assisted vaginal deliveries between hospitals in the Netherlands. Overall, higher intervention rates do not significantly improve perinatal outcome.