

Journal of South Asian Federation of Obstetrics and Gynaecology (SAFOG)

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DRJI, Emcare, IZOR, Index Copernicus (2020),
Microsoft Academic, Infobase, PORTICO

March–April 2022
Volume 14
Issue 2
ISSN 0974-8938
eISSN 0975-1920

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ORIGINAL ARTICLE

Esha R Shanbhag, P Veena

Surgical Site Infections Following Cesarean Section: A Longitudinal Study

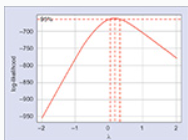
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:77 - 80]

Keywords: Cesarean section, Premature rupture of membranes, Severe anemia, Surgical site infection

DOI: 10.5005/jp-journals-10006-1889 | Open Access | How to cite | Citations 0

Abstract

Aim and objective: To find the incidence of surgical site infections following cesarean section and to assess the associated risk factors and the common pathogens involved in these wound infections. **Materials and methods:** The study was conducted from November 2014 to June 2016. A total of 548 women were included. Data were collected from patients and medical records in a semi-structured proforma and wound site examined till discharge of the patients. After discharge, patients were followed by telephone on day 14 and 30. **Results:** The mean age of the women was 26.20 ± 4.385 years. The mean BMI was 25.965 ± 4.18 kg/m². Forty women out of the total 548 developed surgical site infections with an incidence rate of SSI of 7.3%. Only three cases in them were deep SSI. Gram-negative organisms were the most isolated organisms in the infected cases with *Escherichia coli* being the most common organism. The key risk factors for infections found significant by multiple logistic regression analysis were obesity, severe anemia, prolonged rupture of membranes, multiple vaginal examinations, emergency basis, extended duration of surgery, and skin closure by mattress sutures with silk sutures. **Conclusion:** The infection rate is significantly associated with severe anemia and obesity, prolonged rupture of membranes, multiple vaginal examinations, emergency procedures, prolonged duration of surgery, and silk as a suture material for skin closure with mattress suture.



ORIGINAL ARTICLE

Mohammad Lutfor Rahman, Ema Akter, Zakir Hossain, Aysha Sultana, Kalyan Das

Modeling Gestational Age and Lack of Fit

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:5] [Pages No:81 - 85]

Keywords: Biparietal diameter, Box-Cox transformation, Gestational age, Lack of fit

DOI: 10.5005/jp-journals-10006-1902 | Open Access | How to cite | Citations 0

Abstract

Introduction: Gestational age (GA) refers to age of an unborn baby. Accurate determination of GA is crucial as precise calculation of GA helps reducing post-date labor induction and is particularly useful to assess viability in premature labor and in post-date deliveries. **Aim:** The aim of the article was to determine GA by a minimal number of fetal parameters along with greater accuracy. **Materials and methods:** This was a prospective cross-sectional study, comprising a total of 229 singleton pregnant mothers enrolled from December 2015 to November 2016 in Ibn Sina Diagnostic and Imaging Center and Ad-Din Hospital in Dhaka, Bangladesh. Multiple linear regression models were fitted with four fetal parameters, namely biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), and femur length (FL), and lack of fit was tested in each of the cases. In case of having a significant lack of fit, different types of transformation including Box-Cox transformation have been adopted on the variables to improve the adequacy of the model. **Results:** Among all the fitted models for gestational age by last menstrual period (GALMP), a model with a single explanatory variable, BPD, was found to be comparatively better than others. The Box-Cox transformation was taken on the dependent variable GALMP with λ that equals 0.2, and lack of fit test was not significant at 1% level (p -value = 0.027). Though the results from comparative models do not vary substantially, emphasis on BPD in GA calculation might suffice while cost of experimentation or screening is a grave concern. **Conclusion:** By considering the Box-Cox transformation and proper dealing of outliers, a model for GALMP was obtained without lack of fit where only the BPD appeared to be sufficient as an explanatory variable.



ORIGINAL ARTICLE

Shikha Singh, Ruchika Garg, Ankita Meena, Deesha Kumar

Perinatal Outcome in Vitamin D Deficiency and Effect of Oral and Intramuscular Vitamin D3 Supplementation in Antenatal Women on Pregnancy Outcomes

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:86 - 89]

Keywords: Deficiency, Pregnancy, Pregnant, Vitamin D, Vitamin D3 supplementation

DOI: 10.5005/jp-journals-10006-1888 | Open Access | How to cite | Citations 0

Abstract

Introduction: There is a high prevalence of low levels of Vitamin D in the pregnant women. Vitamin D deficiency is accompanied with adverse maternal and neonatal outcomes. **Aim and objective:** To study perinatal outcomes in vitamin D deficiency, and effect of oral and intramuscular vitamin D3 supplementation in antenatal women on pregnancy outcomes. **Materials and methods:** It is a randomized prospective comparative cohort study. Antenatal women attending antenatal outpatient department were screened for vitamin D deficiency (<20 ng/dL), and deficient women were divided into two groups and treated with 60,000 IU oral tablet/capsule weekly and injection vitamin D intramuscular 60,000 IU every fortnight for 8 weeks, respectively. Both the groups were compared both before and after supplementation for variables like clinical profile and maternal and fetal outcomes. **Results:** In our study, vitamin D deficiency <20 ng/dL was found in 90.9%. About half of the women had vitamin D3 less than 10 ng/mL and 40.6% women had their vitamin D3 level between 10 ng/mL and 20 ng/mL. **After the oral treatment, mean 25-hydroxy vitamin D level increased to 25.6 ± 1.37 ng/mL and 22.8 ± 2.1 ng/mL at 6 weeks and 12 weeks, respectively, in intramuscular treatment. Mean vitamin D level increased to 26.4 ± 1.85 ng/mL and 29.3 ± 2.08 ng/mL at 6 weeks and 12 weeks, respectively. At 12 weeks, the mean vitamin D level in the IM vitamin D group was higher as compared to the oral vitamin D group. In the present study, no statistically significant differences could be found in the incidence of preeclampsia, GDM, and preterm birth but low birth weight babies were more in the vitamin D deficiency group (13.33%) as compared to the normal vitamin D group (6.67%). Conclusion:** There is a high prevalence of vitamin D deficiency in pregnant women in India. Supplementation of Vitamin D as a part of routine antenatal care needs to be established. Both oral and intramuscular vitamin D are effective.



ORIGINAL ARTICLE

Nidhi Gupta, Akanksha Gupta, Shivani Mishra

Magnesium Sulfate for Fetal Neuroprotection in Women at Risk of Preterm Birth: Analysis of its Effect on Cerebral Palsy

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:90 - 93]

Keywords: Cerebral palsy, Fetal neuroprotection, Magnesium sulfate, Preterm labor

DOI: 10.5005/jp-journals-10006-1907 | Open Access | How to cite | Citations 0

Abstract

Background: Magnesium sulfate (MgSO₄) can be used for the primary prevention of cerebral palsy in preterm infants less than 37 weeks of gestational age. **Aim and objective:** To assess the effect of MgSO₄ given for fetal neuroprotection to women at risk of preterm birth. **Materials and Methods:** This study was conducted on 100 women admitted to labor room in the Department of Obstetrics and Gynecology, S.N. Medical College, Agra, between August 2018 and December 2020. These women were randomly distributed into two groups. Women taken for study underwent detailed history, examination, and baseline investigations. In group 1, 50 women at risk of preterm birth before 37 weeks (gestational age, 28–36 weeks 6D) of gestation were given MgSO₄, 4 g bolus over 20–30 minutes followed by 1 g/hour, whereas in group 2, 50 women were not given MgSO₄. **Results:** In our study, the majority of the patients were between the gestational age of 31 and 34 weeks. The mean gestational age was 30.1 weeks in group 1 and 31.5 weeks in group 2. The difference in terms of birth weight between the two groups is statistically insignificant. Neonatal outcomes among women administered MgSO₄ and women not administered MgSO₄ include the following: Neonatal seizures (2 vs 4%), respiratory distress (46 vs 60%), mechanical ventilation (48 vs 62%), and neonatal enterocolitis (6 vs 0.5%). The difference between Apgar scores of the two groups is statistically insignificant. Resuscitation was needed, 4 versus 6%, in group 2. There were 1 mortality in group 1 and 2 in group 2. In group 1, 44% of neonates needed neonatal intensive care unit (NICU) admission, whereas in group 2, 62.5% of neonates needed NICU admission with a *p* value of 0.03095, which is found to be not significant between the two groups. In neonates of group 1, the cases administered MgSO₄ did not show the sign of intraventricular hemorrhage or periventricular leukomalacia, while on the contrary, in neonates of group 2, 4% had ultrasonography suggestive of intraventricular hemorrhage and 6% had periventricular leukomalacia with a *p* value of 0.14, which is statistically insignificant. **Maternal side effects, such as flushing (66 vs 6%), nausea (16 vs 2%), sweating (28 vs 4%), hypotension (2%), tachycardia (4% in group 1), and postpartum hemorrhage, were seen in 4% of women administered MgSO₄ and 2% of cases in group 2. No serious side effects were attributed to MgSO₄, and the commonest side effect was flushing. Administering MgSO₄ with a large margin of safety in preterm births may help to prevent the development of cerebral palsy in preterm infants. As MgSO₄ is a safe, readily available inexpensive drug even if there are modest benefits for its use, the risk-benefit is in favor of its use. Conclusion:** MgSO₄ is the drug currently administered to mothers at the risk of preterm labor for fetal neuroprotection. Further multicenter studies with larger sample sizes exploring immediate adverse outcomes in magnesium-exposed neonates correlated with their serum magnesium concentrations are needed.



ORIGINAL ARTICLE

Bhuvana Srinivasan, Naveena Balasubramanian, Jaya Vijayaraghavan, Santosh Joseph, Usha Rani, Usha Vishwanath, Narayanan Palaniappan, Rajeswari Krishnan Subrahmanyam, Dhanalakshmi Marianallur Ganesan, Vasantha Lakshmi

Study on Outcomes of Pregnancy in Women with Placenta Accreta Spectrum: A 10-year Study in a Tertiary Care Center

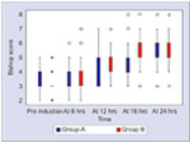
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:94 - 97]

Keywords: Accreta, Increta, Obstetric hemorrhage, Obstetric hysterectomy, Percreta, Uterine artery embolization

DOI: 10.5005/jp-journals-10006-1903 | Open Access | How to cite | Citations 0

Abstract

Introduction: Placenta accreta spectrum (PAS) disorders include accreta, increta, and percreta, which are associated with increased maternal morbidity and mortality. Obstetric hysterectomy for PAS disorders is more associated with massive obstetric hemorrhage than the conservative management methods. **Aim:** To study the outcomes in women with PAS in a tertiary care center—uterine preservation (conservative) versus obstetric hysterectomy with arterial embolization. **Materials and methods:** The patients were divided into three groups: group I included women in whom placenta left *in situ* with uterine artery embolization (UAE) done, group II included women with partial accreta undergone placenta removal followed by UAE, and group III included women who underwent obstetric hysterectomy with arterial embolization. **Results:** A total of 43 women were included in this study between 2010 and 2020. Among 43 women, 28 (65.11%) had accreta, 10 (23.25%) had increta, and 5 (11.62%) had percreta. Group I had 24 (55.81%) women managed by leaving the placenta *in situ* with UAE done. Group II had 9 (20.93%) women undergone placental removal in toto followed by UAE, and group III had 10 (23.25%) women who underwent obstetric hysterectomy with arterial embolization. The outcomes were studied among the three groups in terms of the amount of intrapartum blood loss, ICU admissions, prolonged hospital stay, bladder injury, and disseminated intravascular coagulation. The blood loss and postoperative complications were more in group III, which was statistically significant ($p < 0.0001$). There was no maternal mortality in our study. **Conclusion:** Conservative management by leaving the placenta *in situ* with arterial embolization helps women to retain the uterus and reduces maternal morbidity in PAS disorders.



ORIGINAL RESEARCH

Sandhya Kumari, Vandana Solanki, Urmila Singh, Seema Mehrotra

Comparative Study of Mifepristone with Dinoprostone Gel in Induction of Labor in Full-term Pregnancy: An Open-label Randomized Controlled Trial

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:5] [Pages No:98 - 102]

Keywords: Mifepristone, NNU, Perinatal outcome, PGE2 gel

DOI: 10.5005/jp-journals-10006-1893 | Open Access | How to cite | Citations 0

Abstract

Aim and objective: This study aims to compare the effectiveness and safety of mifepristone with PGE2 gel for cervical ripening and induction of labor. **Materials and methods:** This was an open-label randomized controlled study; 191 patients were included and divided into 94 patients in group A (mifepristone) and 97 patients in group B (PGE2 gel). Tablet mifepristone 200 mg orally was given in group A, and intracervical PGE2 gel was given in group B. Preinduction Bishops score was noted at beginning to compare the improvement in Bishops score after induction. Mode of delivery and induction to delivery interval, complication, and neonatal outcome were noted in both groups. **Results:** Change in Bishops score was noted after 24 hour, and it was comparable in both groups. Induction to delivery interval was significantly less in group B (29 hours) as compared to group A (34 hours). The rate of vaginal delivery was 62.5% in group A and 55.4% in group B. In group A 10.2% and 16.3% in group B required NNU admission. **Conclusion:** Mifepristone is more effective than PGE2 gel for cervical ripening as it has high rate of vaginal delivery and good neonatal outcome.



ORIGINAL RESEARCH

Alka Kriplani, Bhaskar Pal, Vidya Bhat, Onkar Swami

Ferrous Ascorbate: Current Clinical Place of Therapy in the Management of Iron Deficiency Anemia

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:7] [Pages No:103 - 109]

Keywords: Efficacy, Ferrous ascorbate, India, Iron deficiency anemia, Supplemental iron, Tolerability

DOI: 10.5005/jp-journals-10006-1896 | Open Access | How to cite | Citations 0

Abstract

Iron deficiency anemia (IDA) is a major public health problem in India. Iron deficiency can easily be corrected with iron supplementations. Oral iron preparations are used for mild to moderate anemia and available for the supplementation of iron including ferrous sulfate, fumarate, gluconate, glutamate, succinate, and lactate, and the reference product of ferrous ascorbate. In clinical practice, ferrous ascorbate is the most widely prescribed oral iron supplement as it has a good efficacy and is well tolerated in both adults and children. Ferrous ascorbate has a better bioavailability, as high as 67%, and utilization of iron when compared to other iron preparations, including sucrosomial iron. Ferrous ascorbate lacks food interactions and can be administered without regard to food. Ferrous ascorbate is a stable chelate that does not dissociate in the gastrointestinal tract. Higher absorption of iron from ferrous ascorbate can be explained by the ascorbate component that prevents oxidation of the iron to a ferric state. A mean rise in hemoglobin (Hb) greater than 5.0 g/dL in 60 days and greater than 2.0 g/dL within 45 days is reported with once-daily therapy of ferrous ascorbate. Ferrous ascorbate is also efficacious for the prophylaxis of anemia in patients who undergo surgical procedures. Ferrous ascorbate is more effective than ferrous sulfate or carbonyl iron for the treatment of IDA. Thus, ferrous ascorbate has an important place in the clinical management of IDA in real-life scenarios.



ORIGINAL RESEARCH

Rekha Wadhvani, Kanchan N Verma, Neetu Ahirwar

Association of Serum Uric Acid and Serum Calcium with Preeclampsia and Eclampsia

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:110 - 113]

Keywords: Case, Control, Eclampsia, Preeclampsia, Serum calcium, Serum uric acid

DOI: 10.5005/jp-journals-10006-1910 | Open Access | How to cite | Citations 0

Abstract

Aim and objective: To determine the correlation of serum uric acid and serum calcium with the severity of preeclampsia and eclampsia.

Materials and methods: The present case-control study has been carried out for a period of 1 year from March 2018 to February 2019 after institutional ethical clearance. The sample size of the study was 150 cases and 150 controls. This was a case-control study. Cases were admitted patients with preeclampsia or eclampsia. Controls were normotensive pregnant women. On admission, after informed consent, venous serum samples were collected prior to their commencement of intravenous therapy and magnesium sulfate therapy. Blood samples obtained on admission were sent for serum calcium and serum uric acid level estimation, and then, the results were analyzed. **Result:** The mean serum uric acid among cases was 6.98 ± 1.85 mg/dL, whereas in controls, it was 4.55 ± 1.38 mg/dL; similarly, the mean serum calcium among cases and controls was 8.44 ± 1.1 and 9.87 ± 0.69 , respectively. Test of significance observed statistically highly significant difference in mean serum uric acid and serum calcium between cases and controls ($p < 0.01$). The present study observed a significantly higher occurrence of cerebrovascular accident (CVA), and postpartum hemorrhage (PPH) among cases with serum uric acid level greater than 6.2 mg/dL as compared to cases with serum uric acid level less than 6.2 mg/dL ($p < 0.05$). The present study observed that CVA was significantly higher in cases with serum calcium level less than 9 mg/dL ($p < 0.05$). The occurrence of deaths due to pulmonary embolism (PE), pulmonary edema, acute respiratory distress syndrome (ARDS), and multiple organ dysfunction syndrome (MODS) was higher in patients with raised serum uric acid level. **Conclusion:** The present study found that elevated serum uric acid level could be used as a biochemical marker for preeclampsia and eclampsia. Calcium supplement may help in the reduction of incidence of preeclampsia and eclampsia in country especially where nutrition is poor.



RESEARCH ARTICLE

Anuja V Kulkarni, Vishvas M Kulkarni, Rameshwari Alahabade, Prachi D Rulkar, Aditya V Kulkarni

Holmium:YAG Laser: A Better Tool for Hysteroscopic Septal Transection

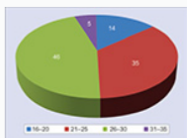
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:114 - 117]

Keywords: Holmium:YAG, Hysteroscopic metroplasty, Laser, Septal resection, Uterine septum

DOI: 10.5005/jp-journals-10006-1887 | Open Access | How to cite | Citations 0

Abstract

Aim and objective: To evaluate the feasibility of the use of Holmium:YAG (Ho:YAG) laser for hysteroscopic transection of uterine septum. **Study design:** A retrospective study of 36 patients with uterine septum who were treated with hysteroscopic metroplasty using Ho:YAG laser from October 2012 to August 2017. **Design classification:** Canadian Task Force Classification-III. **Settings:** A 50-bedded hospital dedicated exclusively to obstetrics, gynecology, infertility, and urology, at a district place in India. **Materials and methods:** Hysteroscopic transection of the uterine septum with Ho:YAG laser was performed in 36 patients, using a 400-micron bare quartz fiber and energy equivalent to 15 W. Normal saline was used as the distending medium. The operative parameters and complications were studied and compared with other studies using other energy sources for the surgery. Postoperative follow-up of 29 patients was done for 18 months to study their reproductive outcome. Relook hysteroscopy was done in eight patients who did not conceive in 8 months of the first surgery. **Results:** The average time taken for the procedure was 17 minutes (10–25 minutes). There were no intraoperative or immediate postoperative complications. On relook hysteroscopy in eight patients, a residual septum was found in one patient and few intrauterine adhesions were found in two patients, which were cut using Ho:YAG laser. Of the 29 patients who had been followed, 23 patients (79.3%) conceived. Out of these 23 conceived patients, 3 patients (13.0%) had abortions, two patients (8.7%) had preterm deliveries at 32 and 34 weeks, respectively, and 18 patients (78.3%) delivered after 35 weeks. So, there were a total of 20 live births (86.9% of conceptions). **Conclusion:** Ho:YAG laser is a precise, simple, effective, and safe tool for the procedure of hysteroscopic transection of the uterine septum.



RESEARCH ARTICLE

Neelima Choudhary, Ashima Kesri, Laxmi Goel, Vikas Chaudhary, Shubha S Trivedi

Doppler Changes in IUGR Pregnancy Following Maternal Corticosteroids: A Prospective Observational Analysis at a Tertiary Care Hospital

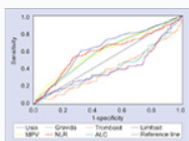
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:7] [Pages No:118 - 124]

Keywords: Betamethasone, Doppler ultrasonography, IUGR-intrauterine growth restriction

DOI: 10.5005/jp-journals-10006-1899 | Open Access | How to cite | Citations 0

Abstract

Aims and objectives: To evaluate the impact of maternal administration of betamethasone on fetoplacental and uterine circulation in preterm pregnancies complicated with intrauterine growth restriction. **Materials and methods:** Prospective observational study included 77 preterm pregnant women from 26- to 34-week period of gestation with IUGR. Color Doppler blood flow study (day 0) of fetoplacental and maternal circulation including umbilical artery middle cerebral artery (MCA), ductus venosus, maternal uterine arteries of all cases was being done. After day 0 Doppler, all received two doses of 12 mg of betamethasone intramuscularly 24 hours apart. Repeat Doppler (day 2) of the above-mentioned vessels was performed between 24 hours and 48 hours of first dose of betamethasone of all cases, and various indices were recorded. Third Doppler examination (day 4) of umbilical artery and MCA was done between 72 hours and 96 hours of first dose of betamethasone administration of all women (60 cases), and then Doppler indices values on day 4 were noted. Tabulated data were analyzed statistically by using appropriate statistical tests such as paired *t*-test, Pearson's Chi-square test, and ANOVA. **Results:** A significant reduction in mean umbilical artery pulsatility index (PI) and S/D ratio was observed on day 2 following betamethasone administration ($p < 0.001$), which was maintained till fourth day after first dose of betamethasone ($p < 0.05$). A significant reduction in mean MCA PI and S/D ratio was obtained on day 2 following betamethasone administration ($p < 0.001$) but the effect was transient and became insignificant by day 4. A significant decrease in mean ductus venosus PI was observed on day 2 following betamethasone administration ($p < 0.05$). No significant change of maternal betamethasone administration in maternal uterine artery PI was observed ($p > 0.05$). **Conclusion:** Fetoplacental circulation of pregnancies with intrauterine growth restriction showed divergent response in terms of changes in various fetoplacental Doppler indices following antenatal betamethasone administration. **Clinical significance:** This offers a unique model to explore the regulation of the fetoplacental vasculature. These findings are also important for fetal surveillance undertaken following corticosteroid administration to pregnant women with IUGR.



RESEARCH ARTICLE

Rendy Singgih, Yohanes Firmansyah, Andriana Kumala Dewi

Clinical Ability of Neutrophil-Lymphocyte Ratio in Pregnancy as a Predictor of Preeclampsia

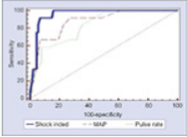
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:6] [Pages No:125 - 130]

Keywords: Neutrophil-lymphocytes ratio, Preeclampsia, Pregnancy

DOI: 10.5005/jp-journals-10006-1892 | Open Access | How to cite | Citations 0

Abstract

Aim and objective: Preeclampsia is part of the hypertension spectrum that occurs during the pregnancy period, especially when the gestational age is 20 weeks or more. Preeclampsia has a broad impact not only on pregnant women but also on the fetus they contain. It is said that in preeclampsia, there is an increase in inflammatory stimulation and an abnormal immune response so that routine blood values increase. Neutrophil-lymphocyte ratio (NLR) values reported in several studies have risen notably in the incidence of preeclampsia. **Materials and methods:** A cross-sectional observational analysis study was conducted on 924 pregnant respondents from January to December 2019 at Cimaean District Hospital, Cianjur. Statistical analysis test of the average difference between the two groups and the prediction test of NLR values was conducted between the healthy pregnant women group of 838 respondents and the group of 86 pregnant women with preeclampsia. **Results:** In statistical tests regarding the differences in the mean of the two groups, a significant NLR value was obtained ($p = 0.004$). Then the NLR value was tested again by the receiver-operating characteristic (ROC) curve method, and the results of the area under the curve (AUC) on the variable values were obtained in the form of AUC: 0.595/ p -value: 0.035. **Conclusion and clinical significance:** Despite the differences in the mean NLR in the two groups, however, the NLR of women in predicting the incidence of pregnancy with preeclampsia is very low.



RESEARCH ARTICLE

Varsha Agarwal, Jyotsna Suri, Prerana Agarwal, Supriya Gupta, Pragya K Mishra, Pratima Mittal

Shock Index as a Predictor of Maternal Outcome in Postpartum Hemorrhage

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:6] [Pages No:131 - 136]

Keywords: Heart rate, Maternal outcome, Mean arterial pressure, Postpartum hemorrhage, Shock index

DOI: 10.5005/jp-journals-10006-1894 | Open Access | How to cite | Citations 1

Abstract

Background: Postpartum hemorrhage (PPH) is one of the leading causes of maternal mortality. Shock index (SI) is a hemodynamic parameter for the early identification of hypovolemic shock. This study was conducted to establish the thresholds of SI for predicting the adverse outcomes in PPH and to compare the predictive value of SI with heart rate (HR) and mean arterial pressure (MAP) at the first hour of hemorrhage.

Materials and Methods: This prospective cohort study was conducted at the Department of Obstetrics and Gynecology in a tertiary care hospital at India. The study population consisted of 100 patients who were randomly selected and delivered after 28 weeks with visual blood loss greater than 500 mL in normal vaginal delivery and greater than 1000 mL during lower segment cesarean section (LSCS). HR, MAP, and SI were noted at the first hour of hemorrhage. Area under the receiver operator curve (AUROC) for SI, MAP, and HR for predicting the adverse outcomes such as need for blood transfusion (≥ 4 blood products), need for intensive care unit (ICU) admission, and need for operative interventions was established and compared. The Threshold value of SI predictive for the above outcomes was established. **Results:** SI greater than 1 was associated with the need for operative intervention, SI greater than 1.3 was associated with ICU admission, massive blood transfusion, and increased morbidity, and SI greater than 1.6 was associated with mortality. AUROC of SI [95% confidence interval (CI)] was highest when compared with MAP and HR for almost all outcomes. **Conclusion:** Shock index is a simple, noninvasive, and sensitive tool that can be used in PPH triage.



RESEARCH ARTICLE

Akhila C Reddy, GN Vasanthalakshmi

Single Intrauterine Fetal Demise in Twin Pregnancies and Pregnancy Outcomes

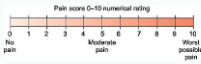
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:5] [Pages No:137 - 141]

Keywords: Pregnancy outcomes, Single intrauterine fetal demise, Twin pregnancy

DOI: 10.5005/jp-journals-10006-1890 | Open Access | How to cite | Citations 0

Abstract

Aim and objective: To study the maternal and fetal outcomes in twin pregnancy with single intrauterine fetal demise. **Introduction:** Single intrauterine fetal demise (SIUFD) in a twin pregnancy is known to be a serious complication of pregnancy. It is a relatively rare complication of multiple pregnancies (5% of all twin pregnancies). Death may occur anytime and increase mortality and morbidity of the survivor twin either secondary to the cause of death of the co-twin or to preterm labor, or both. **Materials and methods:** The data are collected from a medical records department, review of literature, and labor ward parturition register, and patients were followed up in the wards. This study is designed as a prospective observational study and is done in Sri Ramachandra Institute of Higher Education and Research, Tamil Nadu, study period being from April 2017 to April 2019. Sample size was 206 twin deliveries. **Results:** During the study period (2017–2019), 206 women had twin deliveries among a total of 9,951 deliveries occurred in tertiary center. Of these 206 twin deliveries, 12 (5.8%) cases were complicated by the death of one fetus. Among the 12 cases, four had gestational hypertension, two had diabetes, one had preeclampsia, two cases had placenta previa, two cases had deranged liver function tests, among that one was associated with acute fatty liver, disseminated intravascular coagulation, acute kidney injury, and atonic postpartum hemorrhage. The same patient underwent obstetric hysterectomy. Regarding the neonatal outcomes, there were six preterm deliveries, four term deliveries, and two neonatal deaths, due to extreme preterm birth. Management should be individualized, and conservative management is preferred by most of the obstetricians. **Conclusion:** SFD in a twin pregnancy should be managed in a tertiary referral center, where intensive fetal surveillance and adequate neonatal support are available.



RESEARCH ARTICLE

Kunur Shah, Vineet V Mishra, Rohina Aggarwal, Sumesh Choudhary, Smit B Solanki

Efficacy and Acceptability of Office Hysteroscopy before Assisted Reproductive Technology

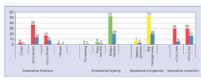
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:142 - 145]

Keywords: Gold standard, Numerical pain rating scale, Office hysteroscopy

DOI: 10.5005/jp-journals-10006-1895 | Open Access | How to cite | Citations 0

Abstract

Introduction: Hysteroscopic technique of diagnosis and treatment of intrauterine pathology without anesthesia has gained popularity over the last few years. Intrauterine pathologies are found to be present in a significant number of infertile patients. Structural abnormalities of the endometrial cavity may affect the reproductive outcome adversely, by interfering with implantation or causing spontaneous abortion. Therefore, exclusion of any intrauterine pathology becomes an important step in infertility work-up prior to IVF. **Objectives:** This study was aimed to estimate the safety, efficacy, and patients' acceptability of office hysteroscopy (OH) for evaluating the uterine cavity in patients of infertility planned for *in vitro* fertilization. **Materials and methods:** This is a prospective observational study enrolling 147 women. All women who were planned for IVF and underwent hysteroscopy were included in the study, and their data were analyzed. Office hysteroscopy was done without anesthesia, and their pain was rated on a Numerical Pain Rating Scale. **Results:** Pain was evaluated using a 10-cm visual analog scale. Statistical analysis was performed using SPSS version 20. Mean age of total patients is 33.51 ± 1.89 years. The mean pain score immediately after the procedure was 2.84 ± 1.26 , and after 15 minutes, it was 0.95 ± 1.20 . Majority of the patients tolerated the procedure well. **Conclusion:** The possibility of doing office hysteroscopy on outpatient basis without anesthesia and accuracy in diagnosing intrauterine abnormalities makes it a gold standard procedure.



RESEARCH ARTICLE

Anshikha Arora, Jai K Goel, Ruchica Goel, Shashi B Arya, Neeraj Prajapati

Ultrasonography and Doppler Study to Predict Uterine Receptivity in Infertile Patients Undergoing Embryo Transfer and its Correlation with Pregnancy Rate

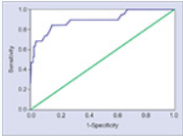
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:5] [Pages No:146 - 150]

Keywords: Assisted reproductive technique, In vitro fertilization, Pulsatility index

DOI: 10.5005/jp-journals-10006-1897 | Open Access | How to cite | Citations 0

Abstract

Aim: To study ultrasonographic and Doppler parameters to predict uterine receptivity in infertile patients undergoing embryo transfer (ET) and its correlation with pregnancy. **Materials and methods:** It was a prospective interventional study, conducted in the *in vitro* fertilization unit of the Department of Obstetrics and Gynecology at Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, on 60 patients who presented with infertility. Transvaginal ultrasound was done on the day of adding progesterone in the frozen ET cycle and the day of trigger in the stimulation cycle. To assess uterine receptivity, we analyzed the ultrasonographic and Doppler parameters. The original Applebaum uterine scoring system was used. This uterine scoring system included ultrasound parameters: endometrial thickness, endometrial layering, and myometrial echogenicity and Doppler parameters: endometrial blood flow, uterine artery pulsatility index (PI), myometrial contractions, and myometrial blood flow. Ovum pickup was done 36 hours after the trigger. Day 3 or day 5 good quality embryos were transferred. Serum beta-human chorionic gonadotropin was performed 14 days after ET to confirm the pregnancy. **Results:** Out of the 60 infertile patients who underwent ET, 38.3% conceived. Patients with a total score of 17–19 had a higher pregnancy rate of 62%. PI, myometrial contraction, and total Applebaum uterine score parameters were significantly ($p < 0.05$) higher among patients with pregnancy than without pregnancy. **Conclusion:** Transvaginal sonography and color Doppler for predicting uterine receptivity by means of Applebaum uterine scoring system are simple, quick, effective, and reproducible methods. **Clinical significance:** Uterine scoring helps us in deciding whether ET should be performed in the present cycle or not.



RESEARCH ARTICLE

Ojasvi Shanker, Mamta Gupta

Role of Mean Arterial Pressure in Mid-trimester Pregnancy for the Prediction of Gestational Hypertension and Pre-eclampsia

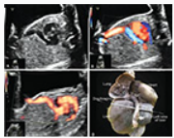
[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:5] [Pages No:151 - 155]

Keywords: Gestational hypertension, Mean arterial pressure, Prediction of pre-eclampsia, Pre-eclampsia

DOI: 10.5005/jp-journals-10006-1898 | Open Access | How to cite | Citations 0

Abstract

Background: Reliable markers for the prediction of pre-eclampsia (PE) and reducing its associated maternal and perinatal morbidity are lacking. **Aims and objectives:** To evaluate the role of mean arterial pressure (MAP) in the second trimester of pregnancy for predicting gestational hypertension (GH) and PE. **Materials and Methods:** Three-hundred and sixteen healthy and normotensive women were enrolled in the second trimester of pregnancy. The mean MAP for the woman was recorded as an average of two MAPs at 3–4 week intervals during the second trimester of pregnancy. All women were followed till term/delivery to predict the development of GH and pre-eclampsia later. **Results:** The performance of MAP for predicting the GH and PE was found to be very good. The area under the receiver operating characteristic (AUROC) for GH was 0.892 with sensitivity and specificity of 84.2 and 84.9%, respectively, whereas the AUROC for PE was 0.948 with sensitivity and specificity of 83.3 and 84.9%, respectively. **Conclusion:** MAP in the second trimester of pregnancy can be used to triage women with low-risk pregnancy for pregnancy hypertension. **Clinical significance:** Mid-trimester MAP is a very good parameter for the prediction of GH and PE. It should be routinely used for risk triaging in low-risk women for the development of hypertension in pregnancy.



RESEARCH ARTICLE

Niranjani Rajachander, Chitra Andrew, Chinnathambi Narayanan Sai Shalini, Shivani Gopal

Ductus Venosus Agenesis: Ultrasound Diagnosis and Outcome

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:7] [Pages No:156 - 162]

Keywords: Congenital anomalies, Doppler ultrasound, Ductus venosus, Ductus venosus agenesis, Extrahepatic venous drainage, Intrahepatic venous drainage

DOI: 10.5005/jp-journals-10006-1901 | Open Access | How to cite | Citations 0

Abstract

Aim: The aim of the article was to enumerate the outcomes observed in fetuses with ductus venosus agenesis (DVA) in a tertiary care center. **Methodology:** A retrospective observational study was conducted at the fetal medicine unit of a tertiary care center between July 2015 and July 2020. Outcomes were followed up for all fetuses diagnosed with DVA. **Results:** A total of 14 patients were diagnosed with DVA in this study period. One patient was lost to follow-up and outcomes of 13 fetuses were studied. Nine patients presented with isolated DVA. Four patients had associated anomalies and underwent termination of pregnancy. Of the remaining nine fetuses with isolated DVA, eight survived with good neonatal outcomes. **Conclusion:** Among eight fetuses with DVA without hepatic bypass (89%) and one fetus with intrahepatic umbilical venous drainage (IHD) (11%), seven of eight fetuses (88%) with isolated DVA had good neonatal outcomes. One fetus with intrahepatic drainage also had a good outcome. This leads to the impression that with close monitoring of the fetuses with DVA, particularly those without hepatic bypass, a good neonatal outcome can be expected. **Clinical significance:** DVA is a rare anomaly. It is known to be associated with chromosomal abnormalities, structural defects, fetal growth restriction (FGR), and intrauterine fetal demise. Evaluation of ductus venosus (DV) at 11–13⁶ weeks scan increases the diagnosis of DVA and its associated anomalies. This helps in the early detection of cardiac anomalies in these fetuses, and additionally, they benefit from close monitoring with serial Doppler evaluation.



RESEARCH ARTICLE

Arati V Mahishale, Manali P Kulkarni

Evaluation of Muscle Strength and Endurance in Postmenopausal Women: A Cross-sectional Study

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:4] [Pages No:163 - 166]

Keywords: Cardiovascular endurance, Muscle strength, Postmenopausal women, Waist-hip ratio

DOI: 10.5005/jp-journals-10006-1905 | Open Access | How to cite | Citations 0

Abstract

Background: There are some evidences which show that postmenopausal women have lower levels of muscle strength and physical function than premenopausal women. Although this has been consistently shown, it is unclear whether the associations found are independent of changes in performance or associated with general aging. Studies have been done to evaluate hand grip and pinch strength in postmenopausal women but there still remain controversies if the strength is spared. As there is dearth of literature about strength evaluation in upper limb, lower limb, and trunk and evaluation of cardiovascular endurance in postmenopausal women. The present study is undertaken to evaluate muscle strength and endurance in postmenopausal women. **Objective:** To evaluate muscle strength and cardiovascular endurance in postmenopausal women. **Methods:** In a cross-sectional study, 65 postmenopausal females were included. Weight, height, BMI, and waist-hip ratio were measured in the study. Muscle strength was evaluated in a group of quadriceps, hamstrings, gluteal, calf, back, and abdominal muscles using a pressure biofeedback unit. Handgrip strength was measured using handheld dynamometer. Cardiovascular endurance was evaluated using 6-minute walk test and step test. **Results:** Muscle strength in upper limb and lower limb muscles was decreased when compared to normative values. With Karl Pearson's correlation test, there is a strong correlation between BMI and lower limb muscle strength in gluteal muscles (p -value = 0.001), in hamstring muscles (p -value <0.05) and in handgrip strength (p -value <0.05) with 64.06% having weak grip strength. Good cardiovascular endurance was seen in most of the women and there was no significant correlation between age and endurance level. **Conclusion:** Postmenopausal women have decreased upper limb and lower limb strength with good cardiovascular endurance. Handgrip strength, gluteal, and hamstring muscle strength were positively correlated with BMI and most of the women presented with central obesity.



RESEARCH ARTICLE

Deepali P Kale, Trupti K Nadkarni, Amol P Pawar, Pooja M Shah, Vandana Bansal, Mehrmoosh Jassawala, Minnie Bodhanwala

Effects of COVID-19 Pandemic on Mental Health Status of COVID-positive Pregnant Women in a COVID Care Center: A Prospective Observational Study

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:7] [Pages No:167 - 173]

Keywords: Anxiety, COVID-19, Depression, Edinburgh postpartum depression scale, Pandemic, Postpartum, Pregnancy

DOI: 10.5005/jp-journals-10006-1904 | Open Access | How to cite | Citations 0

Abstract

Background: The global pandemic of the novel coronavirus disease 2019 (COVID-19) has created a public health emergency straining the entire human race. The population of antenatal and postnatal women is subjected to additional anxiety and psychological stress due to issues related to the pandemic like the public health measures, such as quarantine, and anxiety about the health of the fetus. **Aim:** To study the prevalence of depression and anxiety in antenatal and postnatal women during the COVID-19 pandemic. **Materials and methods:** We have screened 300 women in a COVID-19 care center for psychological depression and anxiety. The Edinburgh postpartum depression scale (EPDS) and also a self-reported questionnaire with COVID-specific anxiety questionnaire with eight items related to the COVID-19 pandemic were answered in graded response scale from 1 to 5. The clinical records identifying high-risk factors along with EPDS score and anxiety response were analyzed. EPDS greater than 13 was suggestive of probable depression. Anxiety questions were analyzed according to the percentage of questions that have been marked as 'much' and 'very much' responses. **Results:** Among 300 women, the prevalence of depression was 43.3%. The anxiety question marked by 39% of women was about worries of the health of fetus graded as "very much" followed by that regarding the worries about delivery marked by 25.3% of women as very much. **Conclusion:** The increased psychological distress among pregnant women irrespective of COVID-19 status is significant. The preventive mental health strategies should be integrated with antenatal and postnatal care of women during the pandemic.



RESEARCH ARTICLE

Jaideep Malhotra, Madhuri Patil

Mindful Digital Program–based Interventions and their Role in Pregnancy and Fetal Outcomes

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:6] [Pages No:174 - 179]

Keywords: Baby Care Program, Baby blues, Fetal development, Mother–fetal attachment, Nuclear family, Pregnancy, Stressors

DOI: 10.5005/jp-journals-10006-1909 | Open Access | How to cite | Citations 1

Abstract

The joint family system provides a support system especially for children, young parents, and parents-to-be and is a major factor in their survival, health, education, development, and protection. It has the major potential to provide stability and support when there are problems. The joint family system even in India is on the decline, and nuclear families are on the rise both in urban and rural areas. This has left the pregnant woman with little or no family support to fall back on, which can be a cause of stress and thus affect the outcome of pregnancy. Moreover, during the COVID, the medical support was also limited, which has added to the distress. Stress in the mother can result in hypertensive disorders of pregnancy with resultant low-birth-weight babies, preterm delivery, adverse neurodevelopmental outcomes for the child, and developmental delays in babies, and all these need to be avoided. iMumz pregnancy, the baby care and parenting digital program, has sought to address these issues by partnering closely with pregnant women, offering a wide range of assistance and activities for maternal well-being in the comfort of their own homes. This study captures the responses and pregnancy outcomes of the women who have used the iMumz pregnancy digital program during pregnancy. **Materials and methods:** This longitudinal study (panel study) was conducted on 512 primigravidas. The study group included 255 pregnant women who opted for a digital holistic health program: "Baby Care Program" (BCP), while the control group consisted of 257 pregnant women who received no such interventions. The BCP included mindfulness meditation, 3 hours of yoga and breathing practices every week, 2 hours of harmonizing music every week, 1 hour of baby bonding activities every week, and 1 hour of personalized diet and pregnancy education each week. The data were collected at 15 and 35 weeks of pregnancy and then from 1 month until 6 months of postdelivery. **Results:** The study showed a statistically significant improvement in sleep patterns and stress levels. It also showed a statistically significant decrease in the incidence of preterm delivery and low birth weight and a better maternal–fetal bonding or attachment (MFA) in the BCP study group compared to the control group. After initiation of BCP activities in the App, 88% of the patients reported a significant reduction in stress. The BCP study group also reported a higher sense of mastery in coping with postpartum blues. Eighty percent of the control group reported postpartum blues as compared to 19% of the BCP users. Moreover, 81.4% of the BCP study group reported more sense of control in managing their pregnancies, despite the stressful COVID environment. **Conclusion:** The BCP activities, such as meditation, yoga and breathing exercise, harmonizing music, baby bonding activities and personalized diet, and pregnancy education, have helped pregnant women to reduce their stress levels with improvement in sleep quality, increased a sense of control over diet and nutrition, and educated about MFA. The use of



RESEARCH ARTICLE

Umme Ruman, Mir M Rhaman, Monowara Khatun

A Multicenter Observational Study to See the Trends of Using Different Contraceptive Agents and Its Drawbacks

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:5] [Pages No:180 - 184]

Keywords: Contraception, Incomplete abortion, Long-acting reversible contraception (LARC), Misoprostol

DOI: 10.5005/jp-journals-10006-1908 | Open Access | How to cite | Citations 0

Abstract

Aim: Bangladesh is a densely populated country where approximately 1,260 people are living per square kilometer. The Ministry of Health of Bangladesh and different Non-Governmental Organizations are providing free contraceptive methods, and for its availability now, our total fertility rate (TFR) is reduced to 2.3. However, due to ignorance and reluctance, family planning utilization is yet suboptimal, especially that of long-term and irreversible methods; and thus, an unexpected, as well as unplanned pregnancy is increasing at a pace. Due to the availability of over-the-counter (OTC) abortifacient drugs like misoprostol and mifepristone (MM) kit in our country, people are consuming unsupervised not only the wrong dose but also in a wrong gestational age. Thus, unsafe abortion is highly increasing, although most of these women know about different types of regular contraceptive methods. In this study, our aim was to observe the trends of using contraception, especially the long-term methods and its drawback. **Methods and materials:** The study design was accepted by the Ethical Review Committee of Combined Military Hospital (CMH) of Bogura. In total, 32,629 women were enrolled in the present study. This retrograde observational study was conducted from July 2017 to June 2019 in four hospitals/clinics—CMH of Bogura, Thengamara Mahila Shobuj Shangha (TMSS) Medical College and Hospital, Mary Stopes Clinic (MSC), and Shurjer Hashi Clinic (SHC). These centers were selected purposively as they have distinct family planning section as well as they maintain well-structured data. Different parameters were compared between 2017 and 2018. Statistical analysis was done using SPSS (version 10), and the result that is lower than or equal to 0.05 has been signified as "statistically significant." **Results:** Among the different contraceptions like short-acting methods [oral contraceptive pill (OCP), condom, and injectable hormones] and long-acting methods [intrauterine contraception device (IUCD) and implant] and permanent methods (tubectomy and vasectomy), the study observed that in CMH of Bogura, the number of OCP and condom users have significantly increased in 2018 compared to that of 2017, and the p -value is 0.047 and 0.039, respectively. In 2018, IUCD users are significantly reduced ($p = 0.0001$) in CMH of Bogura, compared to the previous year, whereas in other hospitals/clinics, the outcome is nonsignificant. In the case of implant users, the number is almost similar in all the centers (for TMSS, $p = 0.063$; SHC, $p = 0.25$; MSC, $p = 0.71$), but surprisingly in CMH of Bogura, no users were found in both years. For the injectable users, it significantly



REVIEW ARTICLE

Usha Saraiya

Medical Women on Planet Venus

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:6] [Pages No:185 - 190]

Keywords: Doctors, Gynecology, Planet Venus Medical Women Craters named after, Woman

DOI: 10.5005/jp-journals-10006-1900 | Open Access | How to cite | Citations 0

Abstract

There are 13 medical women who have graced the craters on Planet Venus by virtue of their contribution to medical science. Out of these, two from each of Germany and India and one from each of nine countries, namely, Iran, Greece, Italy, Spain, France, Britain, Russia, China, and Japan. This presentation will review the biographies of all of them. There are seven who lived and worked in the 19th and 20th centuries. Needless to say, they all have made outstanding contributions to medical relief. Venus has about 1,000 craters identified on its surface. Venus is supposed to be the planet for women. It is known as a twin of Earth as it is of the same mass and size as Earth. In 1991, scientists studying Venus with Magellan spacecraft proposed that these craters be named after famous women. It is an "Honor" for a positive contribution to medical science and society. There have been many space missions to study Venus. The then USSR sent 30 Venera Missions to Venus starting in 1961. Currently, a Japanese Akatsuki spaceship is orbiting Venus. Medical women had a late entry into medical profession, some time in the mid-19th century. They were not welcomed and had to establish themselves against all odds. In a span of 100 years, women in medicine gained a strong foothold and their contribution to health care was acknowledged all over the world. By the end of 20th century, their life and works were immortalized on Planet Venus. The history of the development of women in medical profession is chronicled here. It is a proud moment for all medical doctors that so many grace the craters of Planet Venus.



CASE REPORT

Medini Lakshmeswar, SK Manjula

Left Lower Limb Arteriovenous Malformation at Term Gestation: A Case Report

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:3] [Pages No:191 - 193]

Keywords: Arteriovenous malformation, Crepe bandage, Delivery, Neonate, Rare anomalies, Sclerotherapy, Treatment, Vaginal birth

DOI: 10.5005/jp-journals-10006-1891 | Open Access | How to cite | Citations 0

Abstract

Background: Vascular malformations are relatively rare disorders of the vascular system and its maldevelopment can present at birth. **Case description:** A 21-year-old primigravida presented at 38th weeks of gestation in the latent phase of labor. The patient was a known case of lower limb congenital hemangioma/arteriovenous malformation. The patient claimed to having been born with the deformity at birth, which presented as a small swelling over the lateral aspect of her knee. The patient had procured a single magnetic resonance imaging report that she had undergone 7 years back, which stated diffuse subcutaneous or intramuscular short T1 inversion recovery (STIR) hyperintense lesions in the left thigh and leg as described with phleboliths in the lower third of the thigh and to include the possibilities of venous malformations and venolymphatic malformations. There was anticipated difficulty in delivery owing to poor limb development, limb deformity, and inability to flex the hip and knee, and probable cephalopelvic disproportion was present. Patient spontaneously progressed and underwent full-term vaginal delivery and right mediolateral episiotomy to deliver a live baby girl of birth weight 2.443 kg and APGAR score of 8/10 and 9/10 at 1 minute and 5 minutes, respectively. **Conclusion:** The disorders of the vascular system especially of the lower limb and pelvic girdle cannot be ignored as it can pose many complications during delivery.



CASE REPORT

Neethi Mala Mekala, Suneetha Allanki

A Rare Case Scenario of Sextuple Nuchal Cord Entanglement

[Year:2021] [Month:May-June] [Volume:13] [Number:3] [Pages:2] [Pages No:194 - 195]

Keywords: Six loops of cord, Cord around the fetal neck, Cord entanglement, Nuchal cord, Obstetric complications, Suspicious cardiocography

DOI: 10.5005/jp-journals-10006-1906 | Open Access | How to cite | Citations 0

Abstract

Background: Nuchal cord which means the presence of one or more loops of umbilical cord wrapped 360° around the fetal neck, is a common finding at delivery. It is one of the dynamic factors which is attributed to some unusual consequences during pregnancy and intrapartum period and can lead to operative intervention. The presence of multiple nuchal cord loops (>4) is infrequently reported in the literature. **Case report:** We report a rare case of sextuple (six loops) nuchal cord entanglement which was found during abdominal delivery in a woman who presented with labor pains and had persistent variable decelerations on cardiocography. **Conclusion:** We infer that in the present case, though the presence of six loops of the nuchal cord was not diagnosed on antenatal ultrasonography, good APGAR scores and successful outcome were attributed to timely intervention based on good intrapartum surveillance. **Clinical significance:** Clinical management of nuchal cord entanglement remains an obstetric challenge. So far only two cases with multiple nuchal cord (more than five loops) were reported in the literature. We do report a rare picture of six loops of nuchal cord entanglement with good maternal and fetal outcome.

Clinical Ability of Neutrophil–Lymphocyte Ratio in Pregnancy as a Predictor of Preeclampsia

Rendy Singgih¹, Yohanes Firmansyah², Andriana Kumala Dewi³

ABSTRACT

Aim and objective: Preeclampsia is part of the hypertension spectrum that occurs during the pregnancy period, especially when the gestational age is 20 weeks or more. Preeclampsia has a broad impact not only on pregnant women but also on the fetus they contain. It is said that in preeclampsia, there is an increase in inflammatory stimulation and an abnormal immune response so that routine blood values increase. Neutrophil–lymphocyte ratio (NLR) values reported in several studies have risen notably in the incidence of preeclampsia.

Materials and methods: A cross-sectional observational analysis study was conducted on 924 pregnant respondents from January to December 2019 at Cimacan District Hospital, Cianjur. Statistical analysis test of the average difference between the two groups and the prediction test of NLR values was conducted between the healthy pregnant women group of 838 respondents and the group of 86 pregnant women with preeclampsia.

Results: In statistical tests regarding the differences in the mean of the two groups, a significant NLR value was obtained ($p = 0.004$). Then the NLR value was tested again by the receiver-operating characteristic (ROC) curve method, and the results of the area under the curve (AUC) on the variable values were obtained in the form of AUC: 0.595/ p -value: 0.035.

Conclusion and clinical significance: Despite the differences in the mean NLR in the two groups, however, the NLR of women in predicting the incidence of pregnancy with preeclampsia is very low.

Keywords: Neutrophil–lymphocytes ratio, Preeclampsia, Pregnancy.

Journal of South Asian Federation of Obstetrics and Gynaecology (2021): 10.5005/jp-journals-10006-1892

INTRODUCTION

Preeclampsia is part of the symptom spectrum of hypertension in which blood pressure is or more than 140/90 mm Hg on two tests within 4 hours of pregnancy over 20 weeks accompanied by proteinuria and new onset of thrombocytopenia, renal insufficiency, impaired hepatic function, pulmonary edema, visual, and brain disorders.^{1–5} The clinical presentation of preeclampsia itself has been known since the late 19th century. A researcher stated that preeclampsia is a spectrum of pregnancy toxemia.⁶ Preeclampsia remains a major cause of fetomaternal morbidity and mortality.^{7,8}

Worldwide, 10% of all pregnancies are complicated by hypertension accompanied by preeclampsia and eclampsia, which are the biggest causes of maternal and prenatal mortality and morbidity.⁹ Then other data state that around 2–8% of all pregnancies in the world occur with preeclampsia and are responsible for global maternal mortality as much as 12%.^{10,11} Preeclampsia and eclampsia alone are estimated to cause up to 50,000 maternal deaths per year, with variations in frequency based on geographic regions. In industrialized countries, rates of hypertension in pregnancy associated with mortality are higher in African–American women than for Hispanic, American–Indian, Asian, and Pacific Island women.¹² In Indonesia alone, the incidence of death due to preeclampsia is estimated to be around 7–10% of all pregnancies.⁸

Preeclampsia is divided into two categories, namely mild and severe preeclampsia, that can cause adverse effects during pregnancy, both maternal and uterine, such as proteinuria, edema, cesarean delivery, kidney failure, liver failure, coagulopathy, stroke, respiratory distress syndrome, cardiac arrest, and fetal growth restriction, until the death of the mother or the fetus.^{13,14} Symptoms

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How to cite this article: Singgih R, Firmansyah Y, Dewi AK. Clinical Ability of Neutrophil–Lymphocyte Ratio in Pregnancy as a Predictor of Preeclampsia. *J South Asian Feder Obst Gynae* 2021;13(3):121–126.

Source of support: Nil

Conflict of interest: None

that arise in the event of preeclampsia are severe headaches; visual disturbances, such as blurred vision or glare; severe pain under the ribs; vomiting; and swelling of the face, hands, or feet.¹⁵ Several causative factors explain pathological changes in preeclampsia such as mechanisms due to chronic uteroplacental ischemia, immune maladaptation, very-low-density lipoprotein toxicity, genetics, and increased apoptosis or trophoblastic necrosis.² One of the best known is the inflammatory stimulation of the abnormal immune response and dysfunction of the endothelium that causes hypertension.¹⁴ Based on the results of previously published publications, deficiency from trophoblastic invasion in the first trimester causes preeclampsia later in pregnancy.¹⁰ Another condition of systemic inflammation in preeclampsia is the

involvement of the inflammatory response of T-helper 1 (Th1) and T-helper 2 (Th2) cells.^{7,16} Then in patients with preeclampsia, it was also found that decidual lymphocytes and peripheral mononuclear blood cells synthesize high enough Th1 cytokines.⁷ Involvement and overreactivation of inflammatory cells and immune responses that release inflammatory cytokines and antibodies causing endothelial disorders, such as increased capillary permeability, microvascular thrombosis, and increased vascular tone, are also factors thought to cause preeclampsia.^{10,11,17}

Several recognized inflammatory markers can be a marker for the incidence of preeclampsia such as C-reactive protein and mean platelet volume (MPV). Recently, the use of neutrophil/lymphocyte ratio (NLR) and platelet/lymphocyte ratio (PLR) obtained from routine complete blood counts is widely used as a marker of a systemic inflammatory response, especially preeclampsia.^{1,10,11,16,18,19} In the field of obstetrics, it has been reported that the NLR value is increased in patients with hyperemesis gravidarum, gestational diabetes, preeclampsia, intrahepatic cholestasis in pregnancy, HELLP syndrome, (hemolysis, elevated liver enzyme levels, low platelet levels) ectopic pregnancy, preterm labor, and other diseases.^{18,20,21} The interpretation of laboratory values such as the result of an increased white blood count is of interest to know more. Pregnancy involves a variety of physiological changes, yielding specific preference values for laboratory testing. Based on the above background, the researcher wanted to know the difference in NLR in the group of normal pregnant patients compared to preeclampsia and also to test how strong the NLR variable was in predicting pregnancy with preeclampsia.

MATERIALS AND METHODS

The design of this study was in the form of cross-sectional to see differences in the mean age, gravida, and NLR in the normal pregnancy group and pregnancy with preeclampsia. This research was conducted at Cimaean Regional Hospital, Palasari, Kec. Cipanas, Cianjur Regency, West Java in the June to July 2020 period. The sample of this study included all three-trimester pregnant women in Cimaean Regional Hospital in the period from January 2019 to December 2019. The inclusion criteria for these patients were all pregnant patients undergoing labor and surgery at the Cimaean Regional Hospital. The minimum number of necessary samples used in this study was 700 to the sampling method in the form of total sampling. The procedure of this research started as a research ethics study with the "Tarumanagara University Research Ethics Commission," taking care of licensing with the hospital and medical records.

Furthermore, secondary data in the form of medical records were seen in succession to see data in the form of history taking complaints, history of obstetrics, physical examination, and complete blood. The independent variables in this study include age, gravida, and complete blood laboratory parameters, such as hemoglobin, hematocrit, red cell distribution width (RDW), platelets, neutrophils, lymphocytes, leukocytes, MPV, NLR, PLR, and absolute lymphocyte count (ALC). The dependent variables in this study were pregnancy without preeclampsia and preeclampsia. Prior to statistical testing, the normality of the data was tested using the Kolmogorov–Smirnov and Shapiro–Wilk tests and variance testing between groups with the Levene test. Data analysis or statistical tests conducted in this study are in the form of the independent t-test to calculate the difference of two averages in the normal data distribution and an alternative test

in the form of Mann–Whitney in an abnormal data distribution. When the relationship between the two variables was found to be a significant average difference or p -value < 0.05 between the two groups, the variable will be retested for its predictor ability by the receiver-operating characteristic (ROC) test in predicting the incidence of preeclampsia in pregnancy. ROC or area under the curve (AUC) values are said to have good predictor capability if the angle deviation is above 45° and the p -value < 0.05 . The accuracy of the test is further divided into five groups: AUC value is 0.90–1.00 is considered excellent, 0.80–0.90 is considered good, 0.70–0.80 is considered sufficient (fair), 0.60–0.70 is considered bad (poor), and 0.50–0.60 is considered fail (fail). When the AUC results are below 0.50, the AUC conversion evaluation uses the conversion method for the formula (1-AUC basis) and views the ability of the variable's accuracy as a predictor parameter.

RESULTS

This study included 924 respondents who met the inclusion criteria with the average age of 29.624 (7.33) years and the mean gravida of 2.57 (1.57). The number of respondents in normal pregnant women was 838 (90.7%) respondents and preeclampsia was 86 (9.3%) respondents (Table 1).

The data normality test results for the independent variables on the dependent variable using the Kolmogorov–Smirnov test obtained abnormal data distribution on all variables (p -value < 0.05). Therefore, the statistical test uses an alternative test in the form of the Mann–Whitney test.

The results of the Mann–Whitney test statistic showed that there were significant mean differences between the pregnancy groups without preeclampsia and pregnancy with preeclampsia on the age variable (p -value: < 0.001), gravida (p -value: 0.003), platelets (p -value: 0.001), lymphocytes (p -value: 0.003), MPV (p -value: 0.002), NLR (p -value: 0.004), and ALC (p -value: 0.006) and no significant mean differences between the pregnancy groups without preeclampsia and pregnancy with preeclampsia on variable hemoglobin (p -value: 0.141), hematocrit (p -value: 0.104), RDW (p -value: 0.081), neutrophils (p -value: 0.077), leukocytes (p -value: 0.172), and PLR (p -value: 0.878) (Table 2).

From the results of statistical tests on the average difference between the two groups, seven variables were obtained, which could be used as a reference to predict the incidence of pregnancy with preeclampsia in the form of age, gravida, platelet, lymphocyte, MPV, NLR, and ALC variables. The seven variables tested again using the ROC curve method. This test is used to test how strong the model of each of these variables is predicting pregnancy with preeclampsia. AUC results on the seven variables obtained in the form of age (AUC: 0.627/ p -value: 0.032), gravida (AUC: 0.594/ p -value: 0.032), platelets (AUC: 0.390/ p -value: 0.034), lymphocytes (AUC: 0.402/ p -value: 0.035), MPV (AUC: 0.603/ p -value: 0.033), NLR (AUC: 0.595/ p -value: 0.035), and ALC (AUC: 0.410/ p -value: 0.034) (Fig. 1 and Table 3). From the seven variables, it can seem that although there are differences in the mean age, gravida, platelets, lymphocytes, MPV, NLR, and ALC in both groups, their ability to predict the incidence of pregnancy with preeclampsia is very low.

DISCUSSIONS

Preeclampsia is a progressive, unpredictable, and incurable disease, and the only current treatment is the termination of pregnancy. Identify preeclampsia as early as possible is essential to monitor the

Table 1: Basic characteristics of respondents

Variable	N (%)	Mean (SD)	Med (Min–Max)
Age	924 (100)	29.6212 (7.33)	29 (13–49)
Gravida		2.57 (1.57)	2 (1–11)
• 1	293 (31.7)		
• 2	219 (23.7)		
• 3–5	369 (39.9)		
• >5	43 (4.7)		
Parturition		1.38 (1.41)	1 (0–8)
• 0	319 (34.5)		
• 1	237 (25.6)		
• 2	184 (19.9)		
• 3–5	172 (18.6)		
• >5	12 (1.2)		
Abortion		0.2 (0.49)	0 (0–4)
• 0	766 (82.9)		
• 1	135 (14.6)		
• 2	17 (1.8)		
• >3	1 (0.1)		
Hypertension		33	Elective LSCS
• Normal	838 (90.7)		
• Preeclampsia	86 (9.3)		
Hemoglobin		11.64 (1.53)	11.9 (4.30–16.60)
Hematocrit		33.94 (4.33)	34.2 (10.20–46.80)
RDW		14.32 (2.20)	13.85 (10.60–42.70)
Platelets		257.57 (67.70)	251 (38–499)
Neutrophil		76.99 (8.36)	76.7 (50–96.2)
Lymphocytes		17.33 (7.94)	17.3 (2–74.70)
Leukocytes		11.97 (4.38)	10.80 (4.60–38.20)
MPV		8.41 (0.93)	8.40 (5.90–11.60)
NLR		6.21 (4.99)	4.46 (1–47.800)
PLR		161.04 (104.41)	138.52 (21.16–2111.76)
ALC		1879.02 (735.40)	1819.5 (170–7021.8)

Table 2: Difference in mean complete laboratory blood parameters between groups with and without preeclampsia

Parameter	Disease										p value
	Without preeclampsia (n =86)					Preeclampsia					
	Mean	SD	Med	Min	Max	Mean	SD	Med	Min	Max	
Age	29.24	7.25	28.00	13.00	49.00	32.40	7.10	34.00	17.00	46.00	0.000
Gravida	2.52	1.56	2.00	1.00	11.00	3.02	1.63	3.00	1.00	7.00	0.003
Hemoglobin	11.63	1.49	11.80	4.30	16.60	11.80	1.82	12.10	6.20	15.50	0.141
Hematocrit	33.89	4.29	34.15	10.20	46.80	34.45	4.71	35.05	20.20	43.80	0.104
RDW	14.29	2.21	13.80	10.60	42.70	14.59	2.12	14.15	11.30	25.50	0.081
Platelets	260.22	66.30	252.50	63.00	499.00	231.74	75.78	231.50	38.00	428.00	0.001
Neutrophil	76.84	8.26	76.50	50.00	96.20	78.46	9.21	79.60	56.30	94.20	0.077
Lymphocytes	17.55	7.86	17.60	2.00	74.70	15.17	8.42	11.55	3.30	36.20	0.003
MPV	8.38	0.92	8.30	5.90	11.60	8.72	0.98	8.70	6.90	10.80	0.002
Leukocytes	11.91	4.39	10.70	4.60	38.20	12.51	4.32	11.75	6.10	25.70	0.172
NLR	6.07	4.93	4.34	1.00	47.80	7.55	5.44	6.91	1.68	28.55	0.004
ALC	1898.87	733.43	1839.25	170.00	7021.80	1685.55	730.74	1493.80	498.40	3764.80	0.006
PLR	160.99	106.43	138.43	21.16	2111.76	161.58	82.64	139.39	31.71	397.27	0.878

Table 3: AUC parameter of predictors of pregnancy occurrence with preeclampsia

Test result variable(s)	Area	Std. error ^a	Asymptotic sig. ^b	Asymptotic 95% confidence interval	
				Lower bound	Upper bound
Usia	0.627	0.032	0.000	0.565	0.689
Gravida	0.594	0.032	0.004	0.531	0.658
Trombosit	0.390	0.034	0.001	0.324	0.456
Limfosit	0.402	0.035	0.003	0.333	0.471
MPV	0.603	0.033	0.002	0.538	0.669
NLR	0.595	0.035	0.004	0.526	0.664
ALC	0.410	0.034	0.006	0.342	0.477

The test result variable(s): Usia, gravida, trombosit, limfosit, MPV, NLR, and ALC have at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased; ^aUnder the nonparametric assumption; ^bNull hypothesis: true area = 0.5

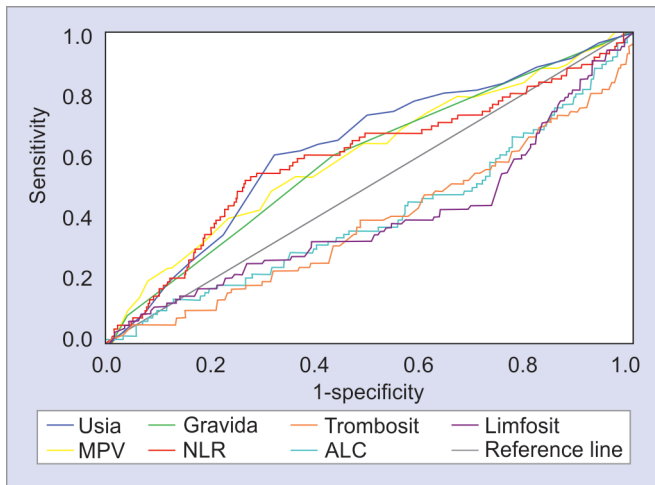


Fig. 1: ROC curve predictor parameters for preeclampsia

clinical condition of the patient and pregnancy so that when giving birth to mothers and children conceived.²² Serological markers in the incidence of preeclampsia are still limited in health facilities and are not routine to do. A complete blood cell examination is a routine blood test that can be carried out and borne by the state insurance agency "Jaminan Kesehatan Nasional."²³ An increase in NLR is associated with an increase in the risk of cardiovascular events, diabetes mellitus, and mortality in several malignant states. NLR was also previously used as a predictor of complications in pregnancy, but the results were inconsistent. For example, NLR did not find satisfactory results to predict hypertension in pregnancy.¹¹ However, in other similar studies, it was found that NLR increased in patients with preeclampsia.²⁴ Nevertheless, further research is needed regarding the predicted value of the incidence of preeclampsia from the use of NLR inflammatory markers.¹⁰

The results of NLR values describe nonspecific inflammatory mediators as first-line defenses and protective components in inflammation. NLR believed in providing diagnostic and prognostic values.⁷ We have involved 924 respondents in making this study. From these results, we found that there were significant mean differences in the NLR variable (p -value < 0.005) between the normal pregnancy group and the pregnancy with preeclampsia (Table 2). A study conducted by Mohammad et al. stated that NLR values were higher in preeclampsia patients

compared to normal pregnant patients and increased significantly in the severe preeclampsia (PEB) group ($p = 0.042$).²⁵ The same results were obtained in a study conducted by Kurtoglu et al. that showed significant NLR results in the group of women with preeclampsia compared to the control group ($p = 0.023$), but when comparing the severity, proteinuria levels, subjective symptoms, and onset of preeclampsia concerning NLR values, there is no difference.¹⁷

Some studies show that NLR values increase significantly only in cases of preeclampsia, especially severe cases.^{17,24} Research Yucel et al. conducted a study that divided the study into three groups between the control group, mild preeclampsia (PER) group, and severe preeclampsia group. Between these groups, no significant results were found in each comparison.¹¹ The results of research conducted by Serin et al. obtained higher NLR values in the PEB group compared to PER ($p = 0.032$) and a positive correlation between NLR values and proteinuria ($p = 0.013$, $r = 0.319$).²⁴ These results are supported by the results of a meta-analysis conducted by Kang et al. involving 3982 patients stating that NLR has a higher value in preeclampsia patients, especially PEB.²⁶ When Widyastiti et al. conducted a study comparing NLR values found differences between normal pregnancies with PEB ($p = 0.000$), and there were also differences between PER and PEB ($p = 0.000$).⁸

Research in India conducted by Gogoi et al. compared NLR values between pregnant women with preeclampsia and the control group of pregnant women with normal tension involving 67 respondents. Their results showed that NLR values were higher in women with preeclampsia than in the control group ($p = 0.001$).¹ In the same country, India, Sachan et al. showed that in women with preeclampsia, NLR values were higher compared to the group of normal pregnant women, even in the early weeks of pregnancy. The ROC curves obtained show significant results of NLR accuracy as a diagnostic value between healthy groups with PER (AUC = 0.75; $p = 0.01$) with a cutoff value >3.35%, sensitivity 52.9%, and specificity 64.5%.²⁷ A similar study to compare NLR values was also carried out in Indonesia by Prasmusinto et al., involving 134 pregnant women with preeclampsia and 118 normal pregnant women. From this research that has been done, it was found that pregnant women with preeclampsia showed higher NLR values with a mean value of 4.41 [95% confidence interval (CI), 1.41–32.54; $p < 0.001$], but the onset of preeclampsia did not affect the NLR value. In the ROC analysis curve, NLR is an important marker of preeclampsia with a sensitivity value reaching 80.1%



and specificity of 87.3% (95% CI, 0.85–0.93; cutoff value 3.295).²³ Research that takes NLR results in the first trimester of pregnancy as an indicator to predict preeclampsia was conducted by Gezer et al. based on the results of multivariate regression analysis showing NLR values increased in preeclampsia patients compared to the group of normal pregnant women (Odd Ratio, 1.43; 95% CI, 1.21–1.76; $p < 0.005$). AUC results from the ROC curve of 0.716 with a cutoff \geq of 3.08, with a sensitivity of 74.6%, and a specificity of 70.1%.¹⁰

Different results obtained in a study conducted by Yavuzan et al., which showed that NLR did not significantly increase in cases of PEB when compared with patients with normal pregnant women.¹⁶ Similar results were also obtained from a population study through a retrospective analysis conducted by Klement et al. with coverage of research respondents up to 11,415 patients. They divided two groups between normal population groups and high-risk pregnant women population, and from these results, they redivided based on the trimester of pregnancy. The results of differences in NLR values based on the time of pregnancy trimester were obtained ($p = 0.3, 0.5, \text{ and } 0.4$) in each trimester.¹⁸ In 2019, a meta-analysis study conducted by Zheng et al. to assess the diagnostic picture of preeclampsia using NLR values showed that the diagnostic accuracy of NLR specificity was less satisfactory, and sensitivity is accepted as a diagnostic aid of preeclampsia.¹⁴

In this research, we have made testing variables to predict pregnancy with preeclampsia using the ROC analysis curve method. The AUC result on NLR variables is 0.595 and p -value is 0.035. Although the NLR variable has a mean difference, the ability to predict the incidence of pregnancy with preeclampsia is very low (Table 3). Our research shows that by using NLR values, the incidence of preeclampsia can be predicted. NLR is an examination that is easy, cheap, and fast to do. Our research is not without limitations; the effects of confounding factors that might obscure the results of this study could be involved, such as body mass index and systemic disease. With the results of this study, clinicians can detect women who are at risk of preeclampsia without symptoms.

CONCLUSION AND CLINICAL SIGNIFICANCE

Data from our study indicate that NLR values can be used to predict the incidence of preeclampsia later in pregnant women. However, it is crucial to know many other factors that also influence the value of the NLR, not only from the state of preeclampsia itself. Because the NLR value is easy, cheap, and fast, it is applied so that the NLR value can be used as a predictor. Future studies with larger samples are expected to be carried out to explore more profound the potential of the NLR value itself to predict the incidence of preeclampsia.

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