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Gynecology & Obstetrics

Systemic Lupus Erythematosus

Second Trimester Dilation & Evacuation

Highlights

Acute Appendicitis during Pregnancy

A Study of Maternal and Foetal Outcomes

Discovering Thoughts, Inventing Future

VOLUME 20 ISSUE 5 VERSION 1.0

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Prevalence of Acne Associated Gynecological Diseases among Multiethnic Female Medical Students

By Khuraseva A.B & Jayaweera J.A.C.S.
Kursk State Medical University

Abstract- *The purpose of the study:* To investigate and analyze the presence of pathological acne and their correlation between gynecological disorders among young female medical students from different ethnicity.

Material and Methods: The prospective study included 126 female students from Kursk State Medical University aged 18-30 years. This study group consists of six nationalities Indians (27.7%), Nigerians (12.6%), Sri Lankans (15.8%), Malaysians (26.9%), Brazilians (9.5%), and Thai (7.1%) accordingly. The clinical nature of acne, genetic predisposition to acne, gynecological history, lifestyle and habits were recorded in the questionnaire.

Results: After analyzing the questionnaire it was found that 84.7%of students have or had acne in past and 15.3% students never had acne. Among them, 8.26% were diagnosed with PCOS, 65.11% were diagnosed with premenstrual syndrome, 1.8% diagnosis with endometriosis 5.6% with vaginal candidiasis 22.2% diagnosed with hirsutism. 77.5% students with acne got normal menstrual cycle (between 22 to 34) 13% students got oligomenorrhea (menstruation cycle above 34 days) 12.1% with polymenorrhea (menstruation cycle lesser than 22 days).

Keywords: *Acne, hormonal imbalance, PCOS, life style modifications.*

GJMR-E Classification: *NLMC Code: WP 100*

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Prevalence of Acne Associated Gynecological Diseases among Multiethnic Female Medical Students

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Conclusion: Many causes of adult acne are due to changes in hormone levels that women experience at certain points during their lives such as before menstrual periods, starting or stopping birth control pills and polycystic ovarian syndrome and their prevalence percentage depend on their nationality.

Keywords: *Acne, hormonal imbalance, PCOS, life style modifications.*

I. Introduction

Acne is the most common type of inflammatory dermatological disease widespread among any age from newborn to menopause [15]. It affects nearly 80% of people at some time between the ages of 11 and 30 years. It can persist for several years and result in disfigurement and permanent scarring, and it can have serious adverse effects on psychosocial development, resulting in emotional problems, withdrawal from society, and depression [28]. Acne is a multifactorial disease which is associated with systemic disorders and also potential skin marker of internal diseases or component of syndromes such as polycystic ovarian syndrome, Hyperandrogenism insulin resistance acanthosis nigricans syndrome (HAIR-AN syndrome) and SAHA syndrome [20].

Women of secondary reproductive age suffer more from acne than men. Psychological stress, diet, smoking, genetic predisposition and hormonal imbalance have been considered as factors that can trigger or worsen acne [15].

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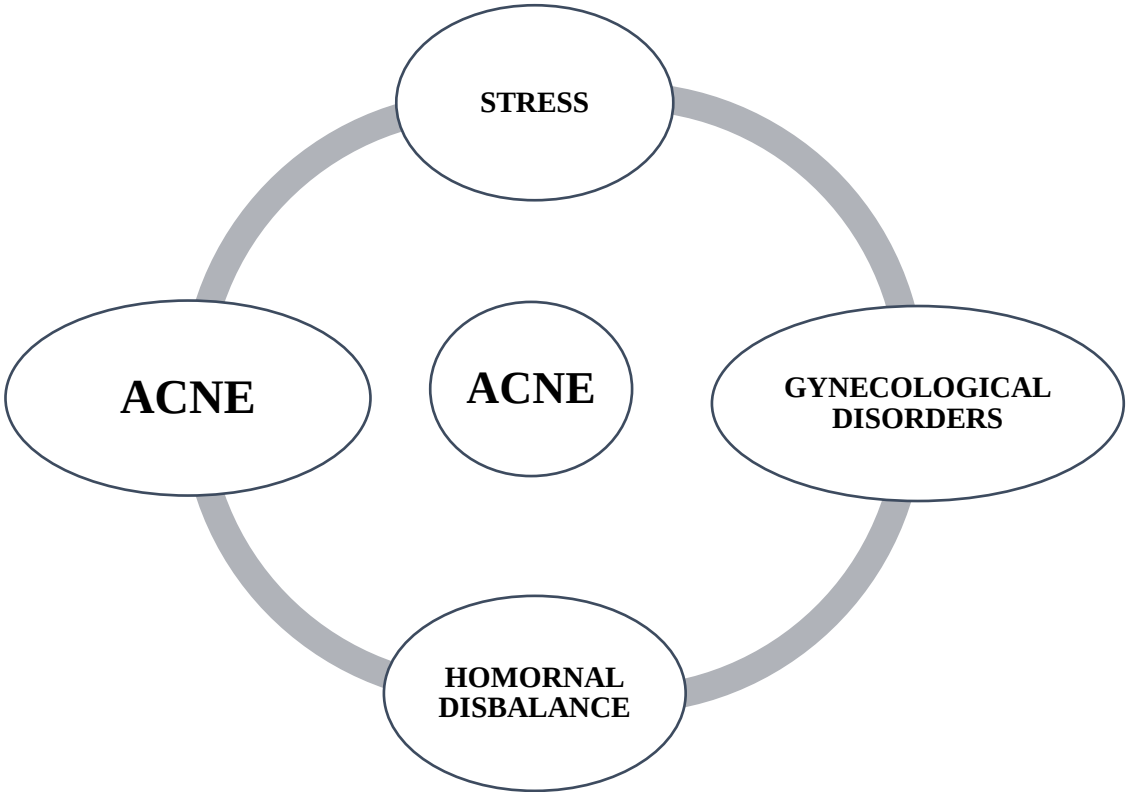

Figure 1: Pathogenesis of acne and risk factors (Khuraseva AB, Jayaweera JACS. Acne associated gynecological diseases and risk factors in the multiethnic women. Obstet Gynecol Int J. 2019; 10(1):42-45. DOI: 10.15406/ogij.2019.10.00411)

II. Material and Method

This research was conducted in the Department of Obstetrics and Gynecology; Kursk State Medical University on 4th year and 5th year female medical students aged 18 to 30. The number of students entrolled in the study was 126 after application of inclusion and exclusion criteria. The experiment consists of female students from Thailand, Nigeria, Brazil, Malaysia, India and Sri Lanka. They were given a questionnaire about the presence and absence of acne, their location, type of acne, health history, gynaecological history, genetic and life style considerations. All students were thoroughly informed about the study aims and through discussion about the procedure, associated benefits and risks and assigned written consent. The response rate was 95%.

a) *The inclusion criteria* was history or / and presence of acne, age above 18 below 30 female, non pregnant and non lactating women.

b) *The exclusion criteria* was absence of acne, age below and above 30, Pregnant and lactating woman

III. Results

After the evaluation of questionnaire following statistical data was obtained. According to the results there were 7.1% Thai, 9.5% Brazilian, 27.7% Indian, 12.6% Nigerian, 26.9% Malaysian, and 15.8% SriLankan students totally. There were 7.1% Thai, 9.5% Brazilian, 17.4% Indian, 12.6% Nigerian 25.4% Malaysian, and 12.7% Sri Lankan students with acne. Whereas 10.3% Indian, 1.6%Malaysian, 3.2% Sri Lankan without acne.

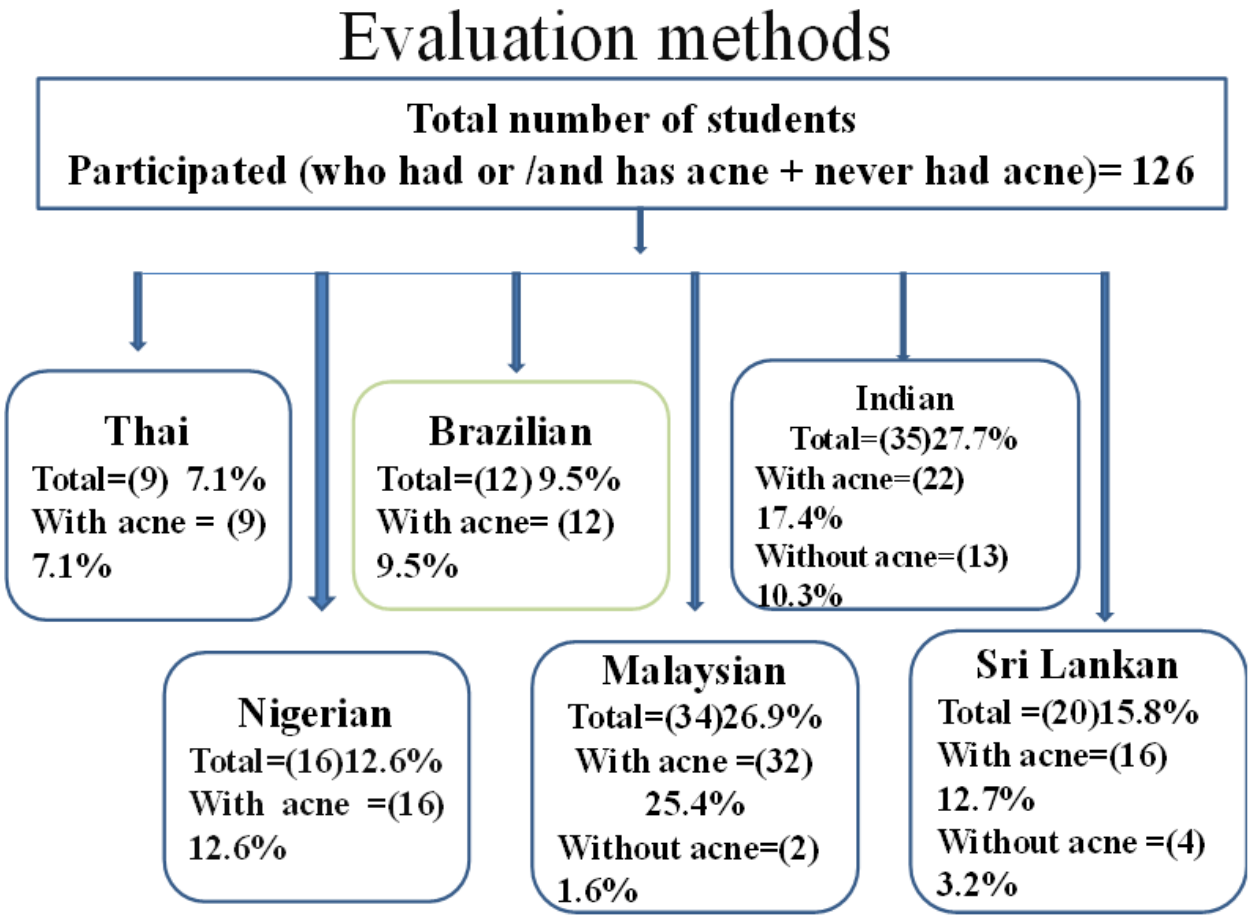

Figure 2: Study design

According to the figure 3, 77.5% students with acne got normal menstrual cycle (menstruation cycle between 22 to 34 days), 13% students got oligomenorrhea (menstruation cycle above 34 days), 12.1% with polymenorrhea (menstruation cycle lesser than 22 days). With reference to figure 4, 61.6% of students with acne got 4-6 days of menstruation duration in one cycle which is considered to be normal. 19.6% students got menorrhagia (7-8 days of menstruation duration in one menstruation cycle). 3.7% students are more prone to hyper menstrual syndrome since more than 8 days of menstruation duration in one cycle. 14.9% students show hypomenorrhea since they have 2-3 days of menstruation duration in one cycle.

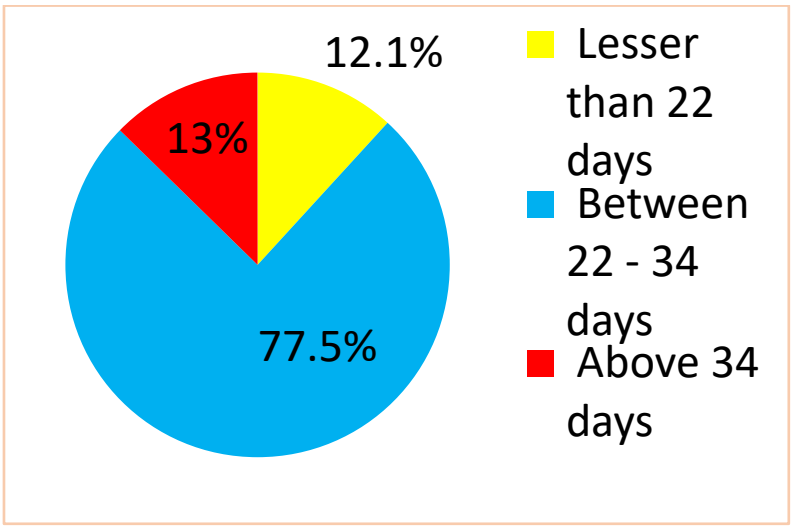

Figure 3: Length of menstruation cycle (students with acne)

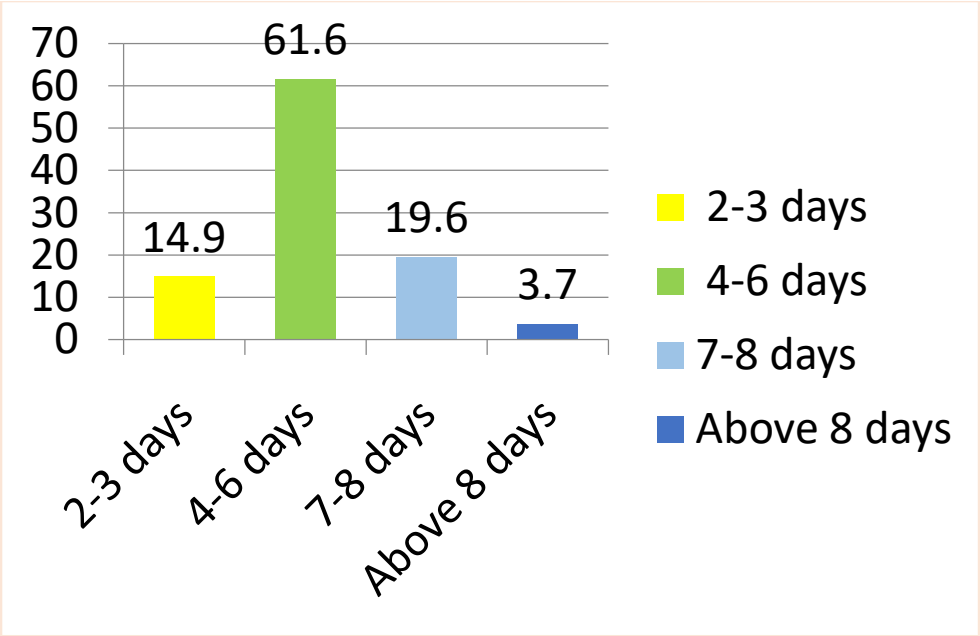

Figure 4: Duration of menstruation cycle (students with acne)

Table 1: Menstrual history of the participants (students with and without acne)

	Students with acne	Students without acne
Average age of menarche	12-13	13-14
Regular menstruation cycle	n=75 59.5%	n=13 10.3%
Irregular menstruation cycle	n=32 25.3%	n=6 4.7%

After analyzing the menstruation history of the participants with acne (with reference table 1) 59.5% students with regular menstruation cycle, 25.3% with irregular menstruation. Participants without acne 10.3% with regular menstruation, 4.7% with irregular menstruation. Average age of menarche for students with acne is 12-13 years old whereas 13-14 years students without acne.

When analyzing the gynecological diseases in the participants with acne the below mentioned results were obtained (figure 5). Brazilian participants got highest variety of gynecological diseases, premenstrual syndrome (11.21%), hirsutism (3.7%), polycystic ovarian syndrome (PCOS) (2.8%), vaginal candidiasis (2.8%), and endometriosis (0.9%) compared to other nationalities.

Nigerian and Thai students got the second largest variety of gynecological diseases. Nigerian participants, got premenstrual syndrome (10.2%), hirsutism (5.6%), polycystic ovarian syndrome (PCOS) (1.86%), and vaginal candidiasis (2.8%). Thai participants got premenstrual syndrome (7.4%), hirsutism (0.9%), polycystic ovarian syndrome (PCOS) (0.9%), and endometriosis (0.9%). Whereas Indian, Malaysian, SriLankan students got only premenstrual syndrome, hirsutism and polycystic ovarian syndrome.

Totally from the students with acne, 8.26% were diagnosed with PCOS, 65.11% were diagnosed with premenstrual syndrome, 1.8% diagnosis with endometriosis 5.6% with vaginal candidiasis and 22.2% diagnosed with hirsutism.

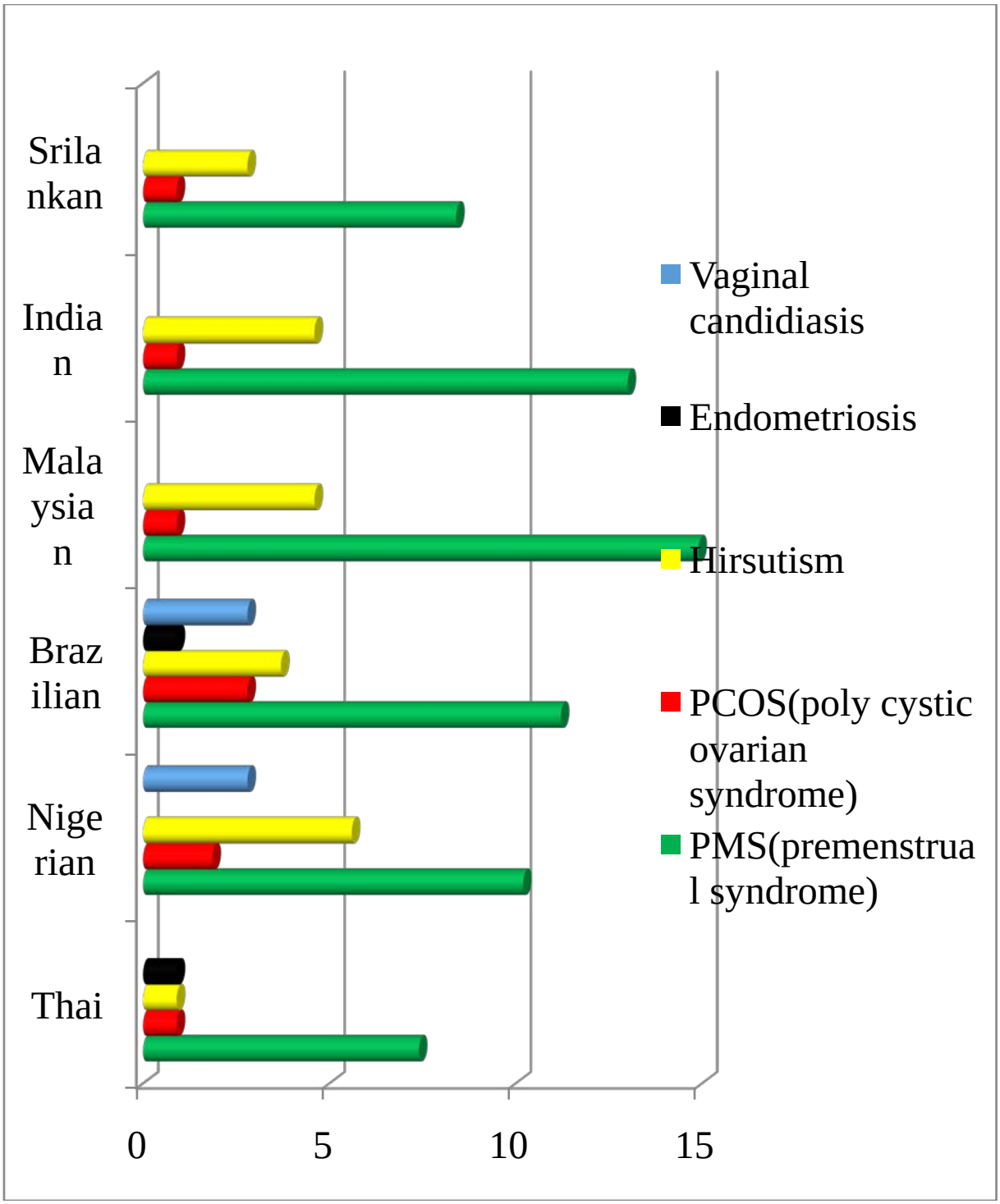

Figure 5: Prevalence of gynecological diseases among students with acne

IV. Conclusion

Acne is a common skin condition which mostly affects woman of secondary reproductive age. It is not only a dermatological problem but also affects woman in socially and psychosocial aspects. Acne can be the sign of many hormone related gynecological diseases.

This study consisted of 126 female medical students which have understandable knowledge about dermatology and gynecology which could help us in increasing the success rate of answers in the study questionnaire. According to research analysis prevalence of acne was found in 84.7% students who participated in this research work. From them considerable number of students with acne have more prevalence to gynecological disorders such as polycystic ovarian syndrome, premenstrual syndrome, endometriosis, vaginal candidiasis, hirsutism,

oligomenorrhea, polymenorrhea, menorrhagia and hypomenorrhea. Brazilian students got highest variety of gynecological disorders where as Srilankan, Malaysian, Indian students got least variety of gynecological disorders.

Being medical students they had to lead a stressful life with more unhealthy foods, lack of physical exercises due to busy schedule with their studies. Unhealthy lifestyle of students might leads to obesity, diabetes mellitus, hormonal imbalance and psychological stress issues which can lead to future severe form of gynecological disorders.

As health care providers it is our main responsibility to pre diagnose and screen the hormonal imbalance, endocrine disorders and gynecological disorders. And take measures to alter healthy life style and stress among young female medical students. These measures could lead to healthy population of young female doctors.

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A Near Fatal Puerperal Flare of Systemic Lupus Erythematosus: Case Report and Review

By Martin Agyei, John J. Annan, Afua Ofori & Betty R Norman

Kwame Nkrumah University of Science and Technology

Abstract- *Background:* Systemic lupus erythematosus (SLE) is a chronic, multisystem autoimmune disease predominantly affecting women, particularly those of childbearing age. It is characterized by fluctuations of disease activity, with periods of high disease activity (i.e., flares) followed by periods of low activity.SLE provides significant challenges in the pre-pregnancy, antenatal, intrapartum, and postpartum periods for these women, and for the medical, obstetric, and midwifery teams who provide care for these women.

History: A 28-year-old woman with SLE, diagnosed two years ago, compliant with medications and medical care and in remission, embarked on a planned pregnancy. Shortly after becoming pregnant, she started losing the hair with the recurrence of skin rash. She developed preeclampsia. She was managed on hydroxychloroquine together with antihypertensives (Nifedipine 30mg BD, Methyldopa 500mgTDS, and Angiotensin Receptor Blocker (Losartan) 100mg daily.

Keywords: *puerperium, systemic lupus erythematosus, flare, hydroxychloroquine.*

GJMR-E Classification: *NLMC Code: WQ 200*

Strictly as per the compliance and regulations of:

A Near Fatal Puerperal Flare of Systemic Lupus Erythematosus: Case Report and Review

Martin Agyei [α], John J. Annan [σ], Afua Ofori [ρ] & Betty R Norman [ω]

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History: A 28-year-old woman with SLE, diagnosed two years ago, compliant with medications and medical care and in remission, embarked on a planned pregnancy. Shortly after becoming pregnant, she started losing the hair with the recurrence of skin rash. She developed preeclampsia. She was managed on hydroxychloroquine together with antihypertensives (Nifedipine 30mg BD, Methyldopa 500mgTDS, and Angiotensin Receptor Blocker (Losartan) 100mg daily.

She had multidisciplinary care of her pregnancy, which was complicated by pre-eclampsia at 35 weeks. She had successful induction of labor and spontaneous vaginal delivery at 35 weeks + 6 days. The immediate postpartum period was uneventful until three weeks into the puerperium when she presented to the obstetric ward with life-threatening signs and symptoms simulated postpartum preeclampsia. She had elevated blood pressure, significant proteinuria, progressive abdominal distension, bipedal edema, anasarca, and easy fatigability with pulmonary edema. Prompt involvement of the Medical team revealed she had a postpartum flare of the SLE. The initiation therapy for the SLE was re-commenced. She had a life-threatening prolonged clinical course, but with multidisciplinary input from the Medical and Obstetric teams, the outcome was successful.

Conclusion: Postpartum life-threatening flares of SLE can mimic postpartum preeclampsia. In patients with SLE, a high index of suspicion, and prompt multidisciplinary care is required to prevent the adverse outcomes.

Keywords: puerperium, systemic lupus erythematosus, flare, hydroxychloroquine.

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Author ρ ω: Department of Internal Medicine, Komfo Anokye Teaching Hospital, Kumasi, Ghana.

I. Introduction

The systemic lupus erythematosus (SLE) is a chronic, multisystem autoimmune disease predominantly affecting women, particularly those of childbearing age. The clinical manifestation and management of SLE provide challenges in the pre-pregnancy, antenatal, intrapartum, and postpartum periods for the woman and the medical, obstetric, and midwifery teams who provide care for these women. The manifestation of SLE is characterized by fluctuations of disease activity, with periods of high disease activity (i.e., flares) followed by periods of low activity.

There are conflicting results about the effect pregnancy has on the health of SLE women. Some studies report an increased rate of flares during pregnancy, while others report no difference in disease activity.[1, 2, 3, 4] A study by Lockshin et al.[5] analyzed the flare characteristics of pregnant and non-pregnant SLE patients and did not find a difference between women who were and were not pregnant. In contrast, Petri et al.[1] found the rate of a flare was greater during pregnancy than in non-pregnant controls, and subsequent analysis by Ruiz-Irastorza et al.[2] found the flare rates during pregnancy and, 6-weeks postpartum were increased compared to non-pregnant, age-matched controls.

Understanding the effect pregnancy has on disease activity is clinically significant as high disease activity during pregnancy is associated with maternal and fetal complications in the antenatal and intrapartum periods and the puerperium. Additionally, examining the rate of flares during the postpartum period is important in determining if patients need to be more closely monitored in the months following pregnancy.

We present a case of a life-threatening flare of SLE in the puerperium and review the literature on the multidisciplinary care of these women during pre-pregnancy, antenatal, and postpartum periods.

II. Case Summary

a) Medical history

Two years before the index presentation, a 28-year-old woman presented to the Medical team with a month's history of having a malar rash associated with non-scarring alopecia. She was a carrier of the sickle cell gene (genotype AS). Skin examination revealed hyperpigmented rash in her ears, and erythematous

rash on the hands and trunk. She had low-grade fever with weight loss. Her laboratory investigation results revealed a moderate anaemia [Hb: 9.3g/dl MCV: 82%, MCH 28.8], normal WBC: $4.5x10^9$/L, urine: RBCs 8-10, urine protein: negative, Anti-ds DNA: positive (>1000). A diagnosis of Systemic Lupus Erythematosus (SLE) was made. She was commenced on the following treatment regimen: Tablets hydroxychloroquine 200mg daily, Tablets Prednisolone 40mg daily, Tablets Azathioprine 100mg daily, sunscreen, and Betnovate ointment. The Prednisolone tablet was later tapered to 10mg daily. She was advised to continue with the hydroxychloroquine, Azathioprine, and low dose prednisolone for a year before becoming pregnant. She was compliant with her medications and this advice. She practiced the natural method of contraception. She had no side effects from the medications. Three months into this treatment, the alopecia, and all the rashes resolved. She continued reviews with the medical team. Two years after her diagnosis of SLE, she achieved a spontaneous pregnancy and was referred for obstetric care.

b) Obstetric history

Her past obstetric history revealed that she had her first pregnancy five years ago. This pregnancy was unplanned and unwanted, so she had a medical termination of pregnancy at one month. There were no post-termination complications. Her second pregnancy, two years after the first, was a wanted one, which unfortunately ended in a missed miscarriage at 12 weeks gestation. She had surgical evacuation of the uterus with no complications. There is no known history of antecedent flare.

She was a Customer care worker married to a banker. She neither smoked cigarettes nor drank alcohol. She had no significant gynecological history.

For the index pregnancy, she booked in early at seven weeks + 3 days. She had a normal booking blood pressure (BP= 120/80mmHg) and a trace of proteinuria. All her booking investigations were normal. She had a total of 11 antenatal visits with a multidisciplinary team of Obstetricians and Physicians. She was compliant with all her antenatal medications. For the SLE, she was managed on hydroxychloroquine.

She was found to have elevated blood pressure at 17 weeks (150/100mmHg) with insignificant proteinuria and bipedal edema. She had no headaches, epigastric pains, or visual disturbances. She was started on antihypertensives (Nifedipine 30mg BD, Methyldopa 500mgTDS, and Angiotensin Receptor Blocker (Losartan) 100mg daily. The blood pressure stabilized between 120 – 140 systolic and 80 – 90 diastolic. At 33 weeks + 6 days, her blood pressure was 140/100mmHg, urine dipstick showed 2+ proteinuria, but she was asymptomatic of preeclampsia. She continued with the antihypertensives. Throughout the pregnancy, she had normal serial ultrasound scans for fetal growth, liquor volume measurements, and Doppler velocimetry.

At 35weeks + 3days, she had an elevated blood pressure of 150/90mmHg and 2+ proteinuria and frontal headaches. She was grossly oedematous. She was admitted for blood pressure control and maternal antenatal administration of steroids to enhance fetal lung maturation.

At 35 weeks + 6 days of gestation, she had an induction of labor on account of preeclampsia with mild features. She had normal progress of labor resulting in spontaneous vaginal delivery to a healthy male baby with a birth weight of 2.5kg and normal APGAR Scores of 6 and 9 at 5 and 10 minutes, respectively. The immediate postpartum period was uneventful, and she was discharged home on the third post-delivery day with a blood pressure of 140/90mmHg.

c) Post-partum events

Three weeks postpartum, she was admitted for emergency obstetric care on account of gradual onset of bipedal swelling, abdominal distension, easy fatigability, and breathlessness over a week. There was no headache, dizziness, epigastric pain, or blurred vision. She had no urinary symptoms such as frequency, dysuria, or nocturia. There was no yellowish discoloration of the sclera. Physical examination revealed a young woman who was grossly oedematous – anasarca. She looked ill. She was apyrexial, anicteric, but pale. She had a grossly distended abdomen and bipedal pittingedema of the whole lower limbs. There was non-scaring alopecia with papular lesions on the body.

Figure 1: Alopecia with papular lesions on the skin

Figure 2: Alopecia with papular lesions on the skin

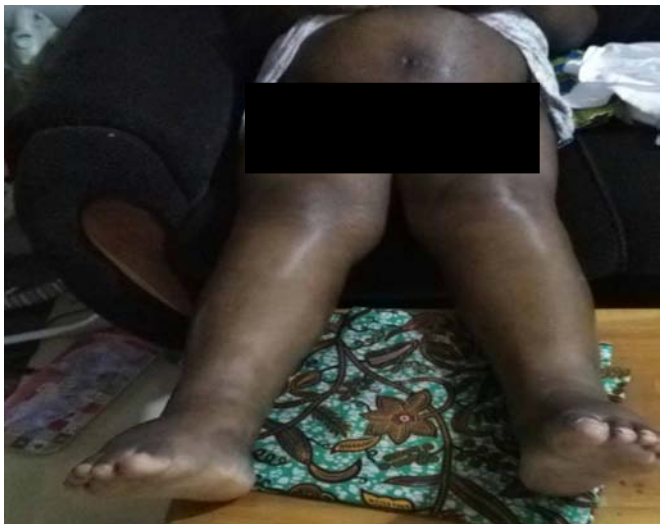

Figure 3: Oedema of lower limbs

She could not lie down in the supine position for a thorough examination as she was breathless with a respiratory rate of 30 cycles per minute. She had decreased chest expansion, stony dull percussion note with diminished breath sounds all on the left side. She had a blood pressure of 118/95mmHg but a tachycardia of 120beats/minute. Heart sounds were normal. Her central nervous system was grossly intact with a Glasgow Coma Score (GCS) of 15/15.Her abdomen was grossly distended. Her liver, spleen, and kidneys were not palpable. There were significant as cites preventing proper evaluation of the postpartum uterus.

A diagnosis of a known SLE patient with pleural effusion suspected to be due to pneumonia and hypoalbuminemia in the puerperium was made. She was admitted to the postnatal ward, stabilized, propped up in bed, and given intranasal oxygen as her SPO_2 was < 92%. Hematological, biochemical, and radiological investigations were done. She was started on intravenous cefuroxime 1.5g stat, 750mg TDS for 48 hours, intravenous metronidazole 500mg TDS for 48 hours, Tabs Folic acid 5mg daily and iron and multivitamin supplements. The results of her investigations are as follows:

- Results

URINE ROUTINE EXAMINATION				
Macroscopy:			Microscopy:	
Colour	straw		Leucocytes	> 999/uL
Protein	3+		Cast	hyaline cast
Blood	2+		Bacteria	+
Leucocytes	2+		Yeast	present
PH	5		Crystals	Absent

Chest X-ray: The significant finding was a left pleural effusion

Abdominopelvic ultrasonography:

Liver: Average size with homogeneous parenchymal echopattern measuring 16.5cm. No focal mass or surface nodularity noted. No extrahepatic duct dilatation is seen.

Gall bladder: Average size with normal sonographic appearance. No intraluminal pathology is seen.

Pancreas: normal. *Spleen:* average sized with homogeneous parenchymal echopattern measuring 9.5cm. No focal mass noted.

Kidneys: Both kidneys were of average size with good corticomedullary and sinus differentiation. No focal masses, calculi, or hydronephrosis noted. (Rt = 11.5cm and Lt= 13.0cm)

Urinary bladder: Uniform wall thickness with normal sonographic appearance. No intraluminal pathology was seen.

Uterus: Average sized measuring 9.1 x 4.4 x 6.3cm with uniform endometrial stripe. Endometrial thickness was 5.2mm. No focal wall masses noted. No endometrial mass lesions, collections, or intrauterine gestation noted. *Adnexae:* No adnexal masses were noted. Both ovaries were not visualized.

Additional comment: There was marked ascites noted.

- Hematology

PARAMETER	VALUE	RANGE
Hb (haemoglobin)	8.9g/dL	11.5 – 16.5
Platelet count	947 x 10^9/L	150 - 450
WBC	7.9 x 10^9/L	4.0 – 12.0

- Biochemistry

PARAMETER	VALUE	RANGE
• LIVER FUNCTION TEST		
AST	24.7 U/L	0 - 32
ALT	15.3 U/L	0 - 33
ALP	92.9 U/L	25 - 147
GGT	39.4 U/L	< 38
TOTAL PROTEIN	41.9 g/L LOW	64 - 83
ALBUMIN	16.0 g/L LOW	35 - 50
GLOBULIN	25.9 g/L	29 - 33
BILIRUBIN – TOTAL	3.3 umol/L	3.42 – 20.51
BILIRUBIN – DIRECT	0.3 umol/L	< 5
BILIRUBIN – INDIRECT	3.0 umol/L	1.71 – 17.1

• RENAL FUNCTION TEST		
UREA	2.78 mmol/L	1.7 – 8.3
CREATININE	57 umol/L	30 - 120
BUN TO CREAT RATIO	22.8	
SODIUM	131 mmol/L	135 - 155
POTASSIUM	5.6 mmol/L	3.6 – 5.5
CHLORIDE	99 mmol/L	98 – 107
URIC ACID	589.0 umol/L	142 - 339

In the course of her admission, she was started on antipyretics and antimalarials due to the development of pyrexia of 39^0 Celsius and the presence of malaria parasitemia. She had nutritional supplementation and intravenous albumin due to the hypoproteinemia with anasarca and enoxaparin for thromboprophylaxis. The cardiothoracic team was involved in the draining of the pleural effusion. She also developed elevated blood pressure that raised the suspicion of postpartum preeclampsia, and she was managed with antihypertensives. She subsequently developed hemoptysis and so pulmonary tuberculosis was suspected, but sputum for AFBs was negative. She additionally developed an ulcer of the right popliteal and posterior thigh with 2 x 2cm infected floor – infected decubitus ulcers. The ulcer was managed with daily dressing, high protein-rich diet, and change in position of the leg. Due to her history of SLE, her Medical team was promptly involved in her care. There was a re-introduction of the initial therapy for SLE. She was started on Tab azathioprine 100mg, Tab prednisolone 10mg, Tab hydroxychloroquine, iron and multivitamin supplements, and Tab Folic acid 5mg daily. The anasarca and chest symptoms gradually subsided.

She was on admission for nine dayswith regular input from the dermatologist, and she was discharged subsequently when the anasarca and chest symptoms had resolved to have a follow-up with the dermatologist.

III. Discussion and Review

This case report is a case of near-fatal puerperium flare of Systemic lupus erythematosus (SLE). SLE is the commonest autoimmune rheumatic disease encountered in pregnancy; knowledge of pregnancy management in such patients is thus important. [6] SLE typically shows a waxing and waning clinical course, but some patients have continuous disease activity. [7]

SLE provides challenges in the pre-pregnancy, antenatal, intrapartum, and postpartum periods for these women. Undoubtedly, the medical, obstetric, and midwifery teams who provide care for these women are not spared of these challenges.

Complications during pregnancy may be maternal (lupus flares, worsening renal impairment, the onset of or worsening hypertension, development of preeclampsia, or venous thromboembolism) and fetal–neonatal (miscarriage, intrauterine growth restriction, preterm delivery, neonatal lupus syndrome [NLS]).[8] Pregnancy in a woman with SLE is associated with an increased risk of adverse maternal and fetal outcomes. This observation prompted physicians in the past to advise their lupus patients not to consider childbirth. With the improvement in outcomes due to better understanding and management of these women, many have been able to achieve successful pregnancies.

As with many medical conditions in pregnancy, the best maternal and fetal–neonatal outcomes are obtained with acohesive multidisciplinary approach. For patients with SLE, the multidisciplinary team may ideally, include a rheumatologist and dermatologist, nephrologist, (based on their predominant symptom), obstetrician, fetal cardiologist, fetal medicine specialist, neonatologist, and specialist midwife. The woman's care should include effective pre-pregnancy risk assessment and stratification, followed by individually tailored pre-pregnancy counseling. When she conceives, she should book early for pregnancy care with rheumatology/ physician and obstetric appointments in the first trimester and an individually tailored antenatal management plan. Early recognition and management of flares and complications (medical and obstetric) are important, with the involvement of practitioners experienced in managing pregnancy in patients with SLE.[6]

The pre-pregnancy assessment is aimed at gathering detailed information to decide on a woman's risks related to pregnancy. This assessment should include past and current SLE disease activity (including most recent flare and frequency), preexisting organ damage (particularly cardiac, lung, and renal), medication history, and a recent serological profile (anti-dsDNA, anti-Ro/La antibodies, antiphospholipid antibodies [aPL], complement). The presence of any additional medical disorders should be elicited, in particular hypertension, diabetes, renal disease, and venous thromboembolism, along with any additional medications.[6]

Additionally, an assessment of the outcomes of all her previous pregnancies is important. Particular attention must be paid to fetal and neonatal complications such as miscarriage, stillbirth, small-for-gestational-age, preterm birth, congenital heart block, and the rash of neonatal lupus erythematosus. Maternal complications such as preeclampsia, antenatal or postpartum flares, and venous thromboembolism are also important. This assessment must necessarily include blood pressure, urinalysis, full blood count, renal

and liver function tests. Based on the outcome of these assessments, women with SLE can be stratified into the following groups: 1) current remission, or stable low disease activity, with stable treatment; 2) early-stage or currently active disease; or 3) severe impairment of organ function or preexisting severe organ damage.[11] Women in group 3 are prone to extremely high risk of complications, including worsening disease progression and end-organ failure. Additionally, serious maternal and fetal/neonatal morbidities and mortalities are associated with such a pregnancy. These women must be advised to avoid pregnancy and use effective contraception. For patients in remission, or stable low disease activity, planned pregnancies are safe, and they are advised to continue their medication. Therefore, SLE patients should be counseled on the risks of SLE with pregnancy, such as flares, progressive organ damage, preeclampsia, venous thrombo-embolism, miscarriage, intrauterine growth restriction, preterm birth, stillbirth, and neonatal lupus syndrome. General pre-pregnancy advice, counseling on optimization of BMI, lifestyle modification, and compliance with medications for SLE are paramount. These measures will improve her health, her chance of conceiving, and the health of her fetus. Optimization of maternal SLE is a sine qua non in ensuring better maternal and fetal outcomes in pregnancy.

In this case, our patient had adequate care of the SLE pre-pregnancy with her Physician. She was in remission, and so she carried on with her fertility wishes.

Once pregnancy starts, that pregnancy is considered a high-risk pregnancy in the SLE patient. However, studies provide conflicting results as to whether flares are more common or of unchanged frequency. [10] Overall, the risk of flare (antenatal or postpartum) appears to be dependent on disease activity 6–12 months before conception. Women with quiescent SLE over this period have less risk of flare during pregnancy, whereas women with active SLE have a high risk of flare. [11] Most flares are non-severe,[8] with articular, dermatological, and mild hematological involvement. These are usually well controlled with a short-term introduction or increase of oral steroids. Nonetheless, severe flares with major organ involvement may occur.[11]

The detection of flares in pregnancy is hampered by the fact that many of the typical signs and symptoms associated with flare are considered normal manifestations of pregnancy.

Apart from flares, the risk of complications such as renal complications, worsening of hypertension, or onset of new hypertension and preeclampsia and venous thromboembolism is increased. Medical complications such as stroke, pulmonary embolism (PE), deep vein thrombosis (DVT), major infections, bleeding, and thrombocytopenia are two to eight times more frequent among women with SLE. [12]

To reduce these adverse outcomes, most studies recommend the continuation of hydroxychloroquine in pregnancy. A systematic review established the protective effect of hydroxychloroquine in terms of organ damage, flares, venous thrombo-embolism, bone mass loss, and long-term survival in the general SLE population, as well as the potential to prevent disease activity in pregnant women. [13]

Another challenge of SLE in pregnancy is that some normal physiological symptoms of pregnancy may mimic some symptoms of SLE, thus making a clear distinction between pregnancy-associated signs and symptoms from those of SLE difficult. Therefore, the involvement of an experienced physicians is important. Fatigue, mild arthralgia, hair loss, dyspnea, headaches, malar and palmar erythema, edema, anemia, and thrombocytopenia represent common ambiguous manifestations.[8] Monitoring of disease status and identification of flares should be done antenatally using full blood count, serum urea, creatinine and electrolytes, liver function tests, serological profile, and urinalysis with proteinuria quantification.

The risk of preeclampsia is noticeably increased in women with SLE. Twenty-three percent or more may develop pre-eclampsia: two- to four-fold higher than the general population. [12, 14, 15] One goal of antenatal visits in these patients is the detection of hypertension, and protein uria to institute early management of preeclampsia. Women with SLE also have a four-fold increased risk of developing eclampsia compared with the general population, although absolute numbers remain small (0.5% vs. 0.09%). [12] A particular challenge in pregnant patients with SLE is differentiating between preeclampsia, and lupus nephritis as these conditions have common symptoms, and they may also be coexistent.

A meta-analysis showed a 10% risk reduction in preeclampsia, preterm delivery <34 weeks, perinatal death, birth weight less than tenth centile, or serious pregnancy outcomes (maternal death, development of preeclampsia; preterm delivery, SGA fetus, stillbirth, or neonatal death) if women take aspirin from <16 weeks of gestation throughout pregnancy. Administration of aspirin is therefore, recommended for all women with SLE in pregnancy. [15, 16]

Fetal complications are also evident in women with SLE. Ongoing pregnancies in patients with SLE carry increased risks of small-for-gestational-age fetuses, intrauterine growth restriction, preterm labor, and preterm delivery. [6] These fetal complications are a result of the risk of uteroplacental insufficiency. As such fetal assessment using fetal ultrasonography for weight, amniotic fluid volume measurements, and Doppler velocimetry is required.

Due to these potential complications, care of these women must ideally be by a multidisciplinary team. Antenatal care of this woman was by a

multidisciplinary team involving the obstetricians, maternal medicine specialist, Physicians, and fetal medicine specialist. She had about 11 antenatal care visits during which a full maternal and fetal assessments were done. The development of hypertension was detected with the prompt institution of a management plan. The prompt treatment of the hypertension ensured minimal complications of the pregnancy until at 35 weeks + 6 days that she developed pre-eclampsia, which was also managed appropriately, leading to a better outcome.

Women should be reassured that while pregnancy with SLE is generally considered a high-risk pregnancy, a tailored management approach with close multidisciplinary surveillance in pregnancy and the puerperium will result in high rates of successful pregnancies. [14]

Labor is not free from the exacerbations of SLE. There may be the need for acute administration of steroids. Stress doses of steroids are required during labor to compensate for the anticipated adrenal insufficiency due to the chronic use of steroids. However, the management of obstetric complications during labor and delivery is not altered due to SLE.

The puerperium, the first six weeks postpartum, was thought to be a period of a high risk of lupus flares,[11] although some groups have found that disease activity decreases after pregnancy.[17] It is likely some patients stop taking their SLE medications due to fear of the adverse effects of these medications on their breastfeeding neonates leading to the flares. Women taking hydroxychloroquine, azathioprine, and steroids for immunosuppression in pregnancy should be reassured that these medications are safe for breastfeeding, and advised to continue.

Properly arranged multidisciplinary postnatal care is important to detect and manage any postpartum lupus complication, and ensure a smooth return to rheumatology outpatient services for ongoing care. A detailed history, clinical examination, and investigations (hematological, biochemical, and serological) is paramount to detect any complications and manage these accordingly. At the postnatal appointment, postpartum counseling and provision of contraception are particularly important in patients with SLE as planned pregnancy is associated with fewer complications and higher pregnancy success rates.[11]

This patient had a prolonged near-fatal flare in the puerperium. Prompt institution of emergency care with a multidisciplinary involvement of the Medical team resulted in the resolution of her condition and returned to normal life activity.

IV. Conclusion

Pregnant women with SLE present an increased risk for maternal and fetal complications. The identification of worsening disease activity in pregnancy and puerperium can be challenging. The best maternal and fetal/neonatal outcomes in SLE in pregnancy and puerperium are obtained with a cohesive multidisciplinary team approach. Maintaining disease remission and treating any flares rapidly is vital. Even in low resource settings, a concerted effort from all involved in the care of these women results in better outcomes.

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Abbreviations:
Hb: hemoglobin concentration
MCV: Mean corpuscular volume
MCH: Mean corpuscular haemoglobin
WBC: White blood cell
RBC: Red Blood cell
ALT: Alanine transaminase
AST: Aspartate aminotransaminase
ALP: Alkaline Phosphatase
GGT: Gamma glutamyltransferase
Anti-ds DNA: Anti-double stranded DNA
SLE: Systemic Lupus Erythematosus
NLS: Neonatal Lupus Syndrome
AFB: Acid Fast Bacilli
BD: twice daily
TDS: Three times daily
BP: Blood pressure
GCS: Glasgow Coma Score
SPO_2: Oxygen Saturation
PE: Pulmonary Embolism
DVT: Deep Vein Thrombosis
SGA: Small for gestational age

Competing interest
All authors declare no competing interests

Ethical approval
Ethical approval was granted by the Institutional Review Board for Research and Development (IRB/R&D) of Komfo Anokye Teaching Hospital, Ghana

Authors' contribution
Study conception and design: Dr. John Jude Annan and Dr. Martin Agyei,
Patient follow-up and data collection: Dr. John Jude Annan and Dr. Martin Agyei,
Drafting of manuscript: Dr. John Jude Annan, Dr. Martin Agyei, Dr. Betty Roberta Norman and Dr. Afua Ofori
Critical revision of the manuscript for intellectual content: Dr. Jude Annan, Dr. Martin Agyei, Dr. Betty Roberta Norman and Dr. Afua Ofori.

All authors had full access to all the data in the study and take responsibility for the integrity of this case report and the accuracy of the literature review. All authors have read and agreed to the final version of this manuscript.

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A Study of Maternal and Foetal Outcomes in Cases of Induction of Labour in a Tertiary Care Centre

By Dr. Priyanka Phunde & Dr. Tushar Palve

Abstract- The aim of the present study was to assess indications for induction, various methods of induction used, the mode of delivery and study of the maternal and foetal outcome. Inclusion criteria were singleton pregnancies with cephalic presentation. Multifetal pregnancies, pregnancies, previous caesarean sections were excluded. Indications, pre-induction Bishop scores, mode of delivery and adverse maternal and foetal outcomes were registered. Most common indications were post datism (57.78 %), premature rupture of membranes (22.22 %), oligohydramnios (13.33 %), Non reassuring foetal heart status (4.44 %), & PIH (2.22%). About 84 % of inductions were done at gestational age 37 weeks and more. Induction of labour resulted in normal vaginal delivery in 60% of cases.

GJMR-E Classification: *NLMC Code: WQ 200*

Strictly as per the compliance and regulations of:

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Dr. Priyanka Phunde [α] & Dr. Tushar Palve [σ]

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I. Introduction

Induction of labour implies stimulation of contraction before the spontaneous onset of labour, with or without ruptured membranes[1]. The goal of induction is to achieve successful vaginal delivery as natural as possible. Induction of labour is considered when the expected benefits of shortening the duration of pregnancy outweigh the potential harms from continuation of pregnancy with no contraindications for vaginal delivery.[2,3]The rate of induction of labour is increasing. In United states, the incidence of labour induction increased 2.5 folds from 9.5 percent in 1991 to 23.8 percent in 2015.[1]

Indications for induction include post term pregnancy, premature rupture of membranes, gestational hypertension, oligohydramnios, abruption, non-reassuring foetal surveillance, significant foetal growth restriction, intrauterine death, maternal medical conditions like chronic hypertension, type I diabetes, renal disorders, significant pulmonary disease (ACOG2016).[4,5,6] Induction of labour in post term pregnancy has reduced likelihood of perinatal death[7,8]. Elective induction of labour is defined as induction without any medical indication in healthy pregnant women.[9,10,11] Some experts term it as non-medically indicated induction of labour.[12] The American College of Obstetricians and Gynaecologists suggests that labour may be induced for logistic reasons including risk of rapid labour, distance from hospital and psychosocial reasons but not before 39 weeks of gestation.

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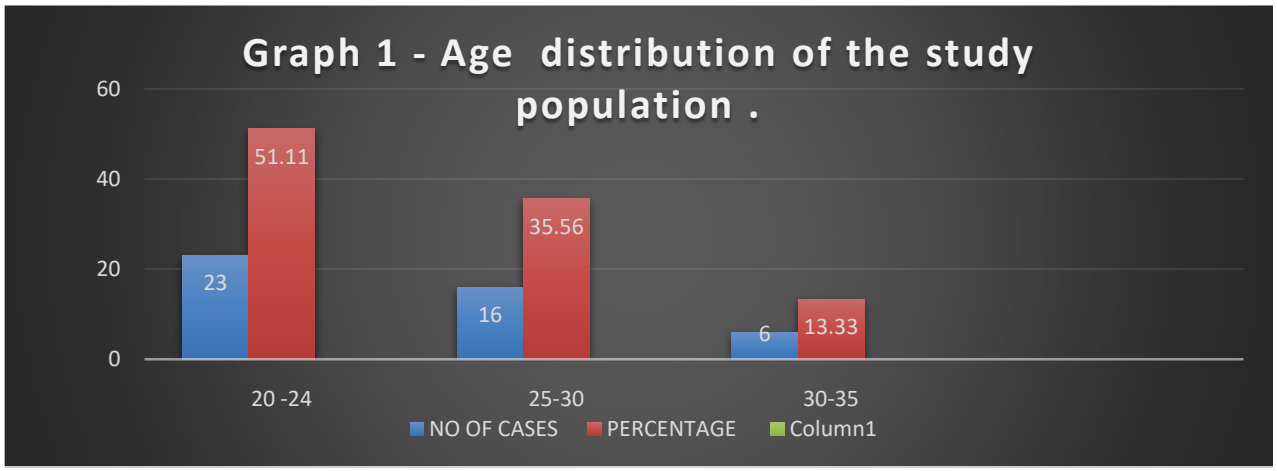
Potential risks associated with induction of labour are increased rate of operative vaginal delivery, caesarean birth, uterine hyperstimulation, non-reactive NST, uterine rupture, mistaken dates leading to preterm deliveries, risk of cord prolapse with artificial rupture of membrane, maternal water intoxication syndrome.[13]. Cervical favourability is the most important factor determining the success of induction. The aim of the study was to assess and evaluate the indications for induction, method of induction used, success rate, maternal and foetal outcome in cases with induction of labour.

II. Aims and Objectives

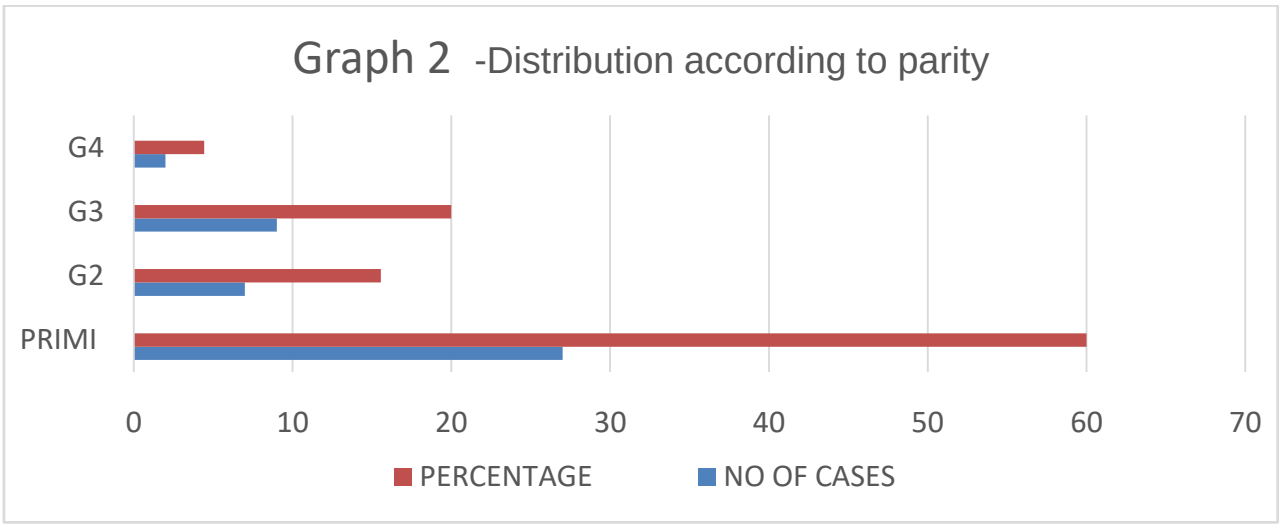
Aim of this study is to assess the clinical profile of patients admitted for induction of labour, indications and different methods of induction used success rates among different methods used, maternal and foetal outcome and complications if any.

III. Material and Method

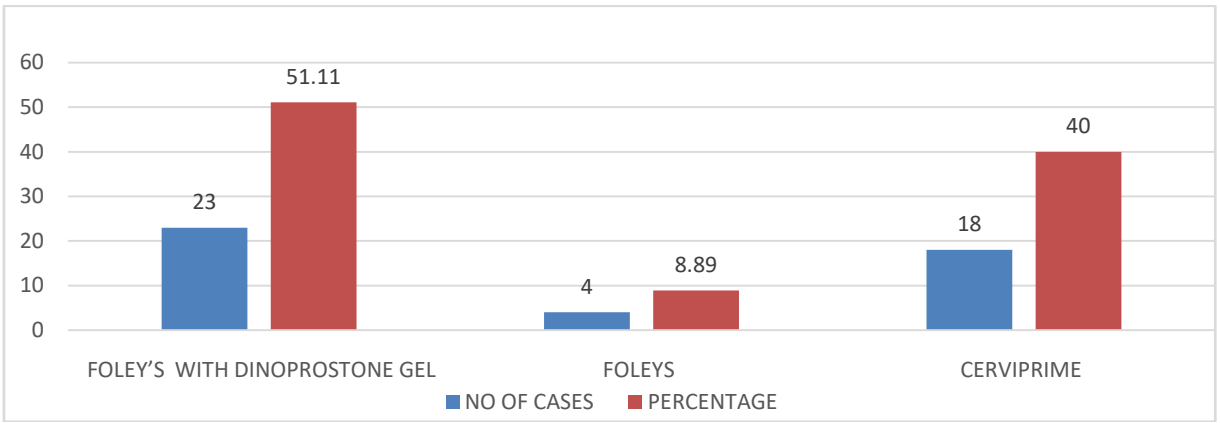
It is a retrospective study conducted over a period of 3 months from January 2020 to March 2020 in Department of Obstetrics and Gynaecology, at a tertiary care centre in Mumbai. We studied the clinical profile of the patients, indications for induction, different methods used, the success rates, mode of delivery, the maternal and foetal outcome in cases of induction, complications. Singleton pregnancies with cephalic presentation at or near term were included in this study. Multifetal pregnancies, malpresentations, transverse lie, previous caesarean sections were excluded. Indication for induction, contraindications, gestational age, cervical favourability (Bishop's score assessment), assessment of the pelvis, foetal size, presentation, membrane status (intact or ruptured) and foetal wellbeing, documentation of discussion of indication of induction and disclosure of risk factors were taken into consideration prior to induction.



In our study majority of cases of induction of labour were of 20 – 25 years of age (51.11%) followed by 25-30 years (35.56%) and 13.33 % cases between 30-35 years of age.

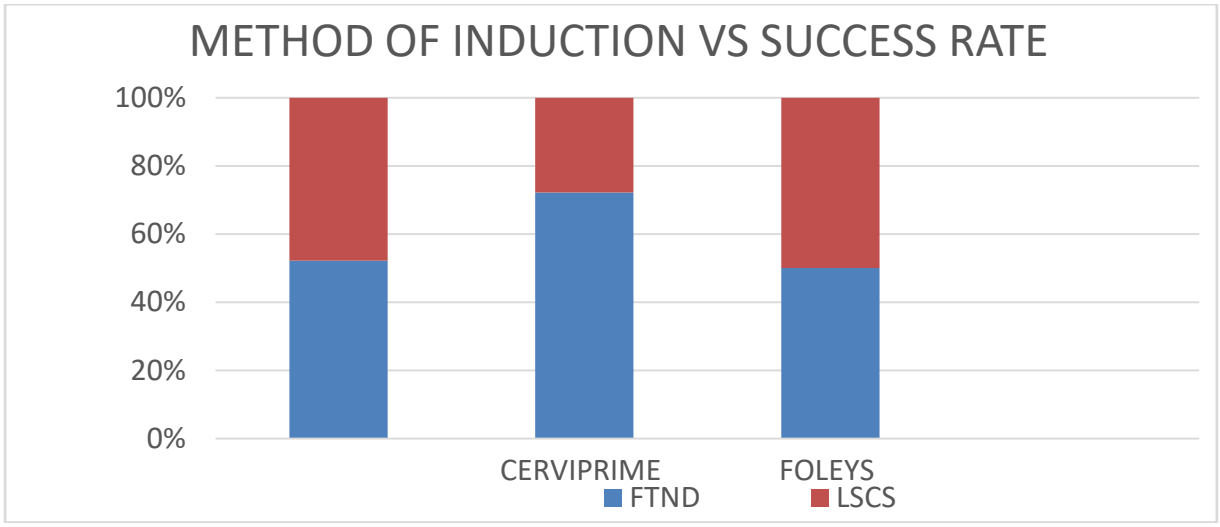


In this study 60 % of inductions were done in primigravida, followed by 20 % in third gravida, 15.56 % in 2nd gravida and 4.44 % in 4thgravida.



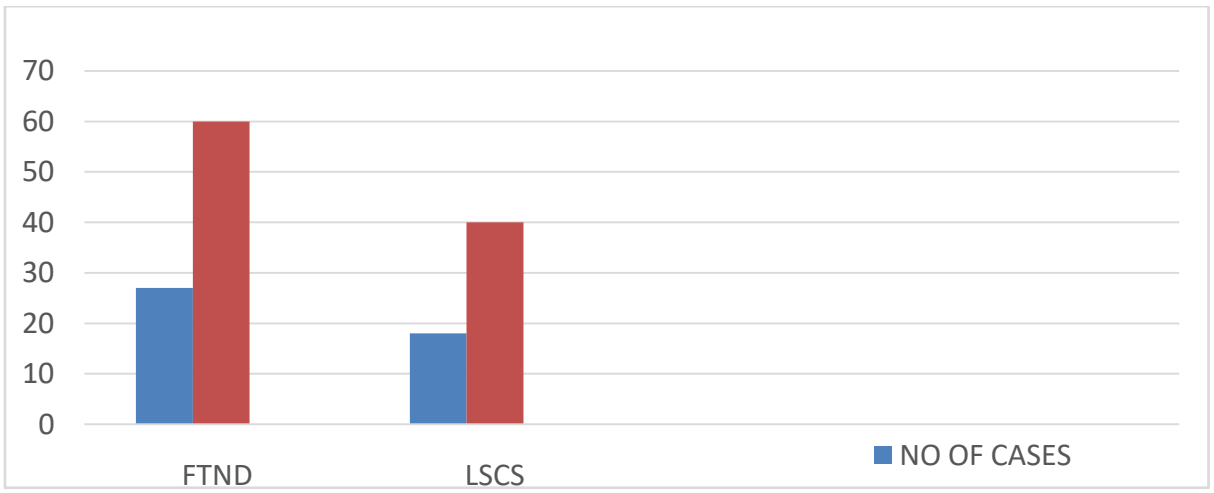
Graph 3: Methods of induction used

In our study 51.11 % inductions were done using transcervical insertion Foley's catheter followed by dinoprostone gel, while 40 % inductions were done using dinoprostone gel alone and remaining 8.89% cases were induced with Intracervical insertion of Foley's catheter.



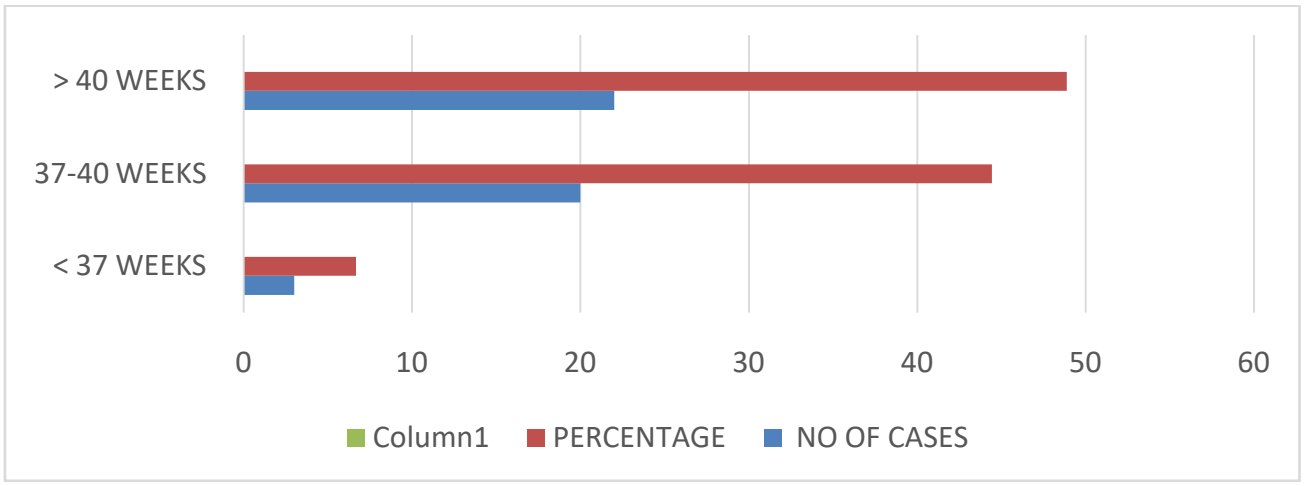
Graph 4: Method of induction v/s success rate

In our study, it was observed that the success rate of induction of labour in the form of vaginal delivery was maximum with intracervical dinoprostone gel (PGE2) gel instillation (72.22 %). Transcervical Foley's catheter insertion followed by dinoprostone gel instillation resulted in normal vaginal delivery in 52.17 % cases. Whereas 50% cases induced with transcervical Foley's catheter insertion resulted in normal vaginal delivery.



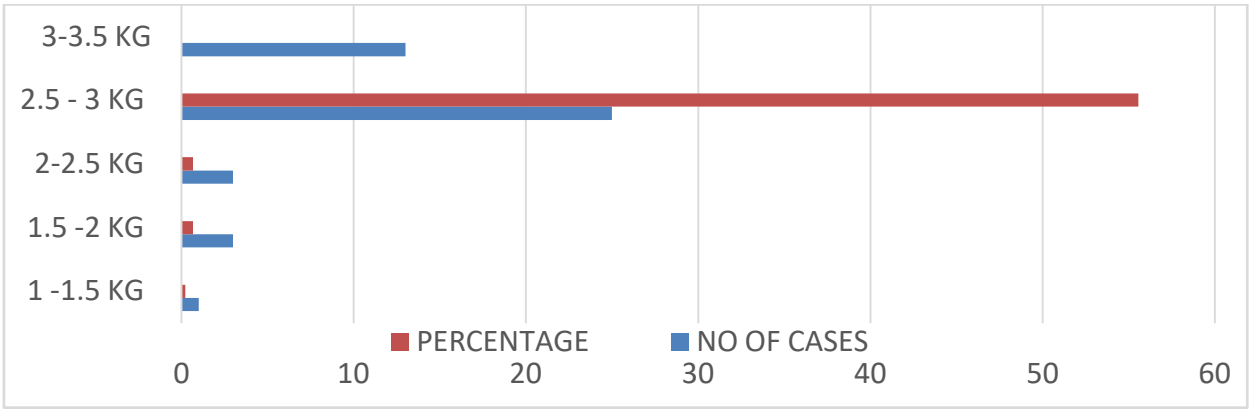
Graph 5: Success rate of induction of labour

In this study it was observed that 60 % cases delivered vaginally and rest 40 % required caesarean section.



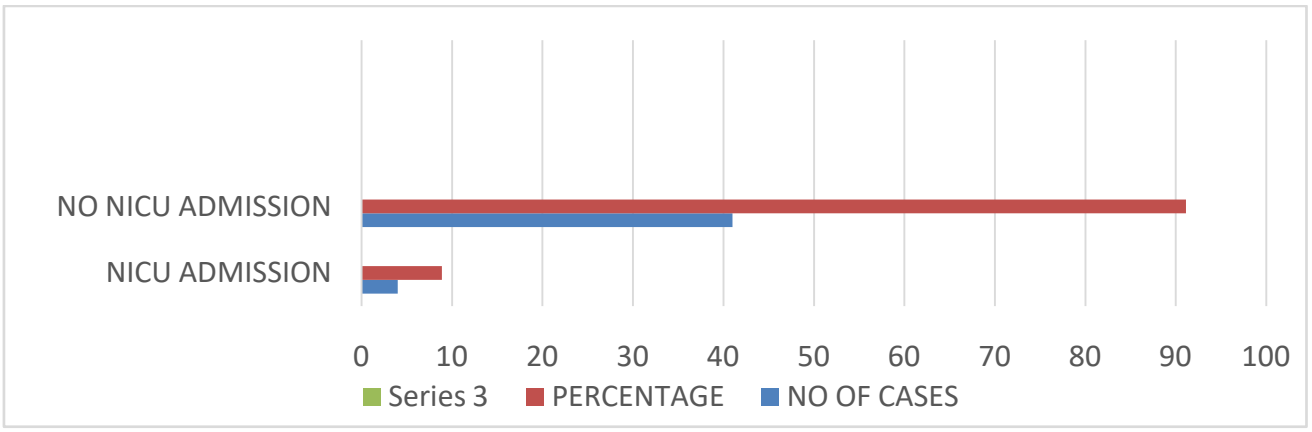
Graph 6: Gestational age at the time of induction

In our study, majority of inductions were done at gestational age > 40 weeks (48.89%) with cause of induction being post-dated pregnancy, PIH, oligo another 44.44 % cases were induced at gestational age of 37 to 40 weeks and 6.67 % cases were induced at < 37 weeks. Thus almost 93.33 % cases were induced at full term gestation.



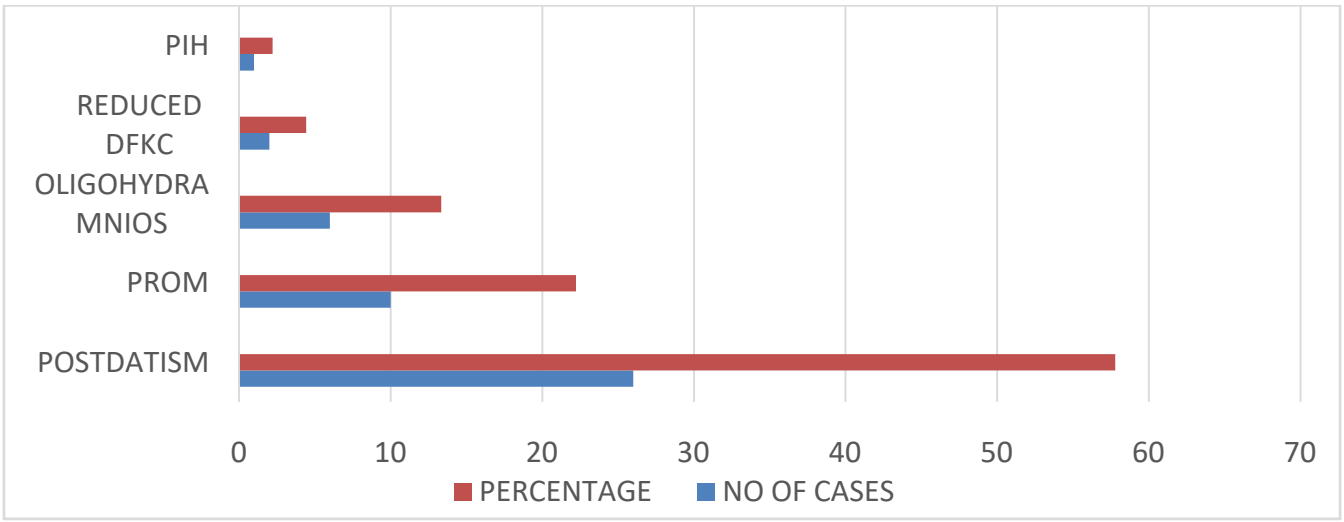
Graph 7: Birth weight

In our study, out of 45,25 babies had birth weight between 2.5 to 3 kg, followed by 13 babies had birth weight between 3 to 3.5 kg,3 babies had birth weight 2 to 2.5 kg another 3 had birth weight 1.5 to 2 kg only 0.22 % had birth weight < 1.5 kg.



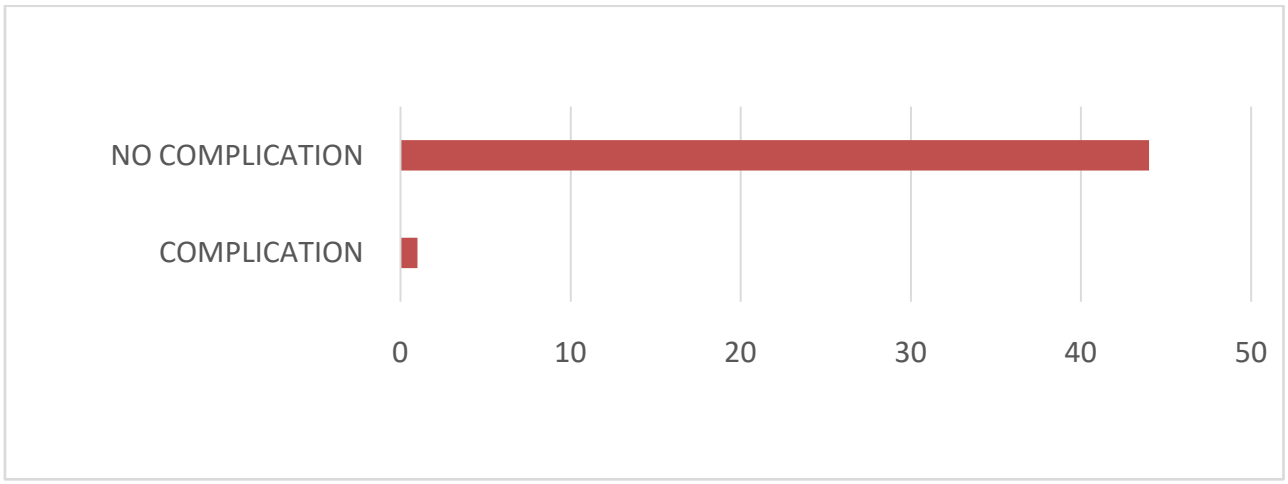
Graph 8: NICU admission

In our study only 4 babies (8.89%) required NICU admission, 3 babies in view of PROM and 1 in view of MSAF with respiratory distress. Rest 41 babies did not require NICU admission.



Graph 9: Indications for induction of labour

Most common indications were post dated pregnancies (57.78 %), premature rupture of membranes (22.22 %), oligohydramnios (13.33 %), nonreassuring foetal heart status (4.44 %), PIH (2.22%).



Graph 10: Maternal complications

In our study only one patient had postpartum haemorrhage. no maternal complication was seen in remaining 44 cases.

IV. Discussion

Most common indication for induction of labour in present study were post-dated pregnancy (57.78 %) Similar findings were observed i.e. 44.5 % in a study 'Outcome of Induction of Labour: A Prospective Study' in Nepal and 45.8% in a study "Outcome and significance of labour induction in a health resource poor setting" in Nigeria. In the present study, premature rupture of membrane (PROM) is the second most common indication of induction (22.22 %), followed by oligohydramnios (13.33).

In our study 51.11 % inductions were done using transcervical insertion Foley's catheter followed by dinoprostone gel, while 40 % inductions were done using dinoprostone gel alone and remaining 8.89% cases were induced with Intracervical insertion of Foley's catheter.

In our study 60 % cases delivered vaginally and rest 40 % required caesarean section. Lamichhane et al in their study observed that 67.7% patients delivered vaginally and 32.3% underwent caesarean section. They found that most common indication for caesarean section was for failure of induction 44% followed by foetal distress 29% and meconium stained liquor in early stage of labour which was about 17% , least common being arrest of descent and dilatation in active stage of labour around 8.7% . In that study out of 67.7 % vaginal delivery, 4.86% had instrumental vaginal deliveries. Patterson J et al in Australia reported that 30.4% nulliparous women delivered by caesarean in his study. In a study, Throsell M et al showed that among induced women, 42% nulliparous and 14% multiparous women delivered by caesarean section.

In our study, it was observed that the success rate of induction of labour in the form of vaginal delivery was maximum with transcervical Dinoprostone (PGE2) gel instillation (72.22 %). Transcervical Foley's catheter insertion followed by dinoprostone gel instillation resulted in normal vaginal delivery in 52.17 % cases. Whereas 50% cases induced with transcervical Foley's catheter insertion resulted in normal vaginal delivery.

In our study majority of cases of induction of labour were of 20 – 25 years of age (51.11 %) followed by 25-30 years (35.56%) and 13.33 % cases between 30-35 years of age. Lamicchane et al in their study observed that the maximum patients belonged to 20 - 30 years of age.

In this study 60 % of inductions were done in primigravida, followed by 20 % in third gravida, 15.56 % in 2nd gravida and 4.44 % in 4th gravida. Similar findings were observed in a study by Patil et al prolonged pregnancy occurred more frequently in primigravida than in multigravida. About 69% cases belonged to primigravida and 31% cases belonged to multigravida.

In our study, majority of inductions were done at gestational age > 40 weeks (48.89%) with another 44.44 % cases were induced at gestational age of 37 to 40 weeks and 6.67 % cases were induced at < 37 weeks. Thus almost 93.33 % cases were induced at full term gestation.

In our study, out of 45, 25 babies (55.55) had birth weight between 2.5 to 3 kg, followed by 13 babies (28.89%) had birth weight between 3 to 3.5 kg, 3 babies (6.66%) had birth weight 2 to 2.5 kg another 3 (6.66%) had birth weight 1.5 to 2 kg only 0.22 % had birth weight < 1.5 kg. In a similar study by Lamichanne et al it was found that 88.76% of babies birth weight was in between 2.5 -3.5kg. In the same way 4.6% of babies weighed less than 2.5 kg and 26% of babies weighed more than 3.5kg, which showed that there is less chances of

complications due to foetal macrosomia, as most of the baby delivered were of average size. Lawani O et al reported that 80.5 % of babies delivered were in between 2.5kg -3.9 kg.

In our study there was no evidence of foetal mortality. Only 4 babies (8.89%) out of 45 required NICU admission, 3 babies in view of PROM and 1 in view of MSAF with respiratory distress. Rest 41 babies did not require NICU admission. In a similar study by Heimstad R et al in 20075.5% of born babies needed NICU admission. Gelisen O et al. in 2007 reported 4.3% of babies required NICU among induced patients. Nielsen P et al. in 2005 reported that there was no need of NICU admission of baby in induced group. In a similar study 99.7% of baby born were born alive. 2.07% were admitted in ward or NICU for observation or other interventions. Among these admitted babies, 0.51% of babies expired during treatment at ward or NICU. Compared with expectant management, elective induction of labour between 37 to 41 weeks of gestation periods associated with reduced perinatal mortality. Rates of admissions to a neonatal

In our study only one patient had postpartum haemorrhage. no maternal complication was seen in remaining 44 cases. Patil et al in their study of maternal and perinatal outcome in induction of labour at 40 weeks and 41 weeks of gestation observed that maternal morbidity like increased rate of caesarean section, PPH, perineal tear, sepsis and cervical tear are more common in 41-week group in compare to 40-week group.

V. Conclusion

In our study, it was observed that the success rate of induction of labour in the form of vaginal delivery was maximum with transcervical dinoprostone (PGE2) gel instillation (72.22 %). Transcervical foley's catheter insertion followed by dinoprostone gel was successful in 52.17 % cases. 50% cases induced with transcervical Foley's catheter insertion resulted in normal vaginal delivery. So induction of labour with dinoprostone gel used alone or with foleys catheter resulted in successful delivery. There was no significant increase in the cesarian section rates with any of the methods. And overall maternal and perinatal mortality and morbidity was reduced with timely induction for indicated cases.

Labour induction should be done if the benefits of termination of pregnancy overweighs that of continuation of pregnancy. Pregnancy and labour is a natural process and we should allow its natural course until and unless the indication for induction is justified.

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Second Trimester Dilation & Evacuation in a Patient with Uterus Didelphys

By Haley Glatthorn & Glenmarie Matthews

Abstract- Uterus didelphys is one of the rarest of the Mullerian duct anomalies and can lead to unique obstetric and gynecologic outcomes and considerations. This case describes a patient with known uterus didelphys and intact longitudinal vaginal septum who desired termination of pregnancy at 17 weeks gestation due to fetal anomaly. She underwent dilation and evacuation (D&E) under ultrasound guidance and the pregnancy was removed from the right-sided uterus. Preoperative mifepristone and misoprostol were used for cervical ripening. This case demonstrates that second trimester D&E can be safely performed on patients with uterus didelphys and is aided by the adjunctive use of prostaglandins, mifepristone, and ultrasound guidance to avoid intraoperative complications.

Keywords: *didelphys, dilation and evacuation, termination, Mullerian anomaly.*

GJMR-E Classification: *NLMC Code: WP 1*

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Second Trimester Dilation & Evacuation in a Patient with Uterus Didelphys

Second Trimester D&E with Uterus Didelphys

Haley Glatthorn [α] & Glenmarie Matthews [σ]

Abstract- Uterus didelphys is one of the rarest of the Mullerian duct anomalies and can lead to unique obstetric and gynecologic outcomes and considerations. This case describes a patient with known uterus didelphys and intact longitudinal vaginal septum who desired termination of pregnancy at 17 weeks gestation due to fetal anomaly. She underwent dilation and evacuation (D&E) under ultrasound guidance and the pregnancy was removed from the right-sided uterus. Preoperative mifepristone and misoprostol were used for cervical ripening. This case demonstrates that second trimester D&E can be safely performed on patients with uterus didelphys and is aided by the adjunctive use of prostaglandins, mifepristone, and ultrasound guidance to avoid intraoperative complications.

Keywords: didelphys, dilation and evacuation, termination, Mullerian anomaly.

I. Introduction

Mullerian duct anomalies include a wide range of congenital structural abnormalities of the female reproductive tract. During typical embryogenesis, the Mullerian ducts fuse completely to form a single uterus, cervix and vagina in the developing female fetus[1]. Mullerian anomalies occur when this process does not occur to completion. The resulting anatomical abnormalities vary by the degree to which fusion fails to occur and are categorized as arcuate, septate, bicornuate, unicornuate, or didelphysuterus[2]. A didelphys uterus is the most extreme variant of this phenomenon and is characterized by complete duplication of the uterus, cervix, and vagina[1-3]. This is one of the rarest of the mullerian anomalies with an estimated incidence between 1 in 2,000 to 1 in 30,000 in the general population[4] In this case report, we describe a patient with a didelphys uterus who had an uncomplicated second trimester termination of pregnancy with dilation and evacuation.

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II. Case

The patient is a 32 year old gravida 2 para 1 with a known history of didelphys uterus diagnosed at age 14, and a prior cesarean section on the contralateral uterus. She presented to our practice at 16 weeks gestation for a second opinion and early anatomic survey due to suspected fetal anomaly. She was otherwise healthy with no significant medical history. Ultrasonography findings were significant for a pregnancy in the right uterus complicated by anhydramnios diagnosed with an amniotic fluid index of 1.0 cm, as well as bilateral polycystic kidneys in the fetus. The patient was counseled on the implications of these findings and the poor prognosis for the pregnancy. She elected to undergo chorionic villus sampling for genetic testing and planned for termination of pregnancy the following week.

Attempt was made to place laminaria prior to the procedure but the right cervix was not easily identified on exam. The patient was referred to our complex family planning department and was scheduled for D&E at 17 weeks 1 day gestation. Prior to surgery, we discussed the possibility of septum resection to aid in visualization of the bilateral cervices. However, the patient strongly desired to maintain the septum if possible, as it had not caused any problem to date. The patient was consented for D&E under ultrasound guidance and possible septum resection. She received 200 mg mifepristone the day prior to surgery in the office and 600 mcg misoprostol buccally two hours prior to the procedure. Operative findings showed a didelphys uterus with both the right and left cervix visualized, a vaginal septum separating the cervices, and an intrauterine pregnancy in right uterus, which was approximately 17-week size. An exam under anesthesia was performed and the right cervix was noted to be 1 cm dilated, 0% effaced, and -3 station. The fetal parts were removed without difficulty. During and after evacuation of the placenta, brisk bleeding was noted and was determined to be secondary to uterine atony. The patient's bleeding responded well to uterotonics and hemostasis was achieved after one intramuscular dose of methergine 0.2 mg and misoprostol 1000 mcg per rectum. The fundus was noted to be firm with good uterine tone. Ultrasound

guidance was utilized to visualize the cavity and the endometrial stripe appeared clean. Estimated blood loss was 300 milliliters.

The patient had an uncomplicated post-operative course and recovered well. She did not endorse any complaints at her follow up visit.

III. Discussion

There is limited information in the literature regarding termination of pregnancy in a patient with uterus didelphys. To our knowledge, ours is the first case report to describe second trimester D&E on a patient with this condition. Goldwaithe, et al describe a failed attempt at dilation and curettage with suction for a patient with uterus didelphys who desired first trimester elective termination of pregnancy[5]. Despite the use of ultrasound guidance, they were unable to safely access the uterus containing the pregnancy due to difficulty with instrumentation. The patient then had a successful medical abortion using mifepristone and misoprostol[5]. We utilized pre-operative mifepristone and misoprostol, which likely assisted us in successfully completing a surgical abortion. Our experience suggests that these standard cervical preparation agents can be used with good result. Initially, laminaria placement was attempted on our patient but it failed due to inability to adequately visualize her right cervix. We then saw the patient several days later and elected to use pharmacologic pre-operative cervical ripening. We would recommend again pursuing this approach in the future, as there is evidence that cervical preparation with mifepristone works more quickly and is a less painful method of cervical ripening compared to laminaria in second trimester termination of pregnancy[6]. While mifepristone is approved by the Food and Drug Administration (FDA) for its use in inducing medical termination of pregnancy, misoprostol is not. However, misoprostol is often utilized off-label for cervical ripening in both induction of labor and termination of pregnancy and is widely accepted in clinical practice.

The presence of a longitudinal vaginal septum appears to be ubiquitous in patients with uterus didelphys[7] However, the extent and flexibility of the septum varies within the population of women with this condition[7]. Some patients opt for removal of the septum if it is a source of dyspareunia, however removal is not necessary for normal sexual function or for successful vaginal delivery[7]. An intact septummay be at higher risk for tearing during the second stage of labor as the fetal vertex descends. However, the septum may be flexible or lateral enough to avoid injury during delivery[7]. Our patient was consented for possible resection of the septum in the event that it interfered with our ability to safely instrument the gravid uterus. However, there was ultimately no need to remove it and it was her desire that it remain intact. Resection of the septum does not appear to be a necessity for normal sexual function, successful vaginal delivery, or completion of D&E, but it remains a reasonable option if a patient desires removal or the septum prohibits the provider from safely completing a procedure.

In our patient, uterine atony was noted after evacuation of placental tissue but responded well to uterotonics. Due to the rarity of this condition, it is unknown if this patient's anatomic differences caused an increased risk for atony or hemorrhage. The prior case reports that we surveyed on obstetric and gynecologic outcomes in patients with uterus didelphys do not note any bleeding complications[4,7], and this patient did not endorse any history of excessive blood loss with her prior cesarean delivery. Maki, et al describe the delivery of twin fetuses—one vaginally and one via cesarean section—in separate horns of a didelphys uterus[8]. During the patient's labor course, her uterine contraction patterns were monitored via tocometer and each uterus contracted independently of the other approximately 90 percent of the time. This suggests that synchronous myometrial contraction is independently generated in each uterus from two separate pacemaker sites[8]. The contraction stimulus spreads via gap junctions, and the anatomical separation of the two uteri prevents communication with the contralateral horn[8]. Therefore, in the case of our patient, the non-pregnant left uterus likely had little bearing on the ability of the right uterus to contract down adequately.

We utilized intraoperative ultrasound guidance to direct our instruments appropriately and avoid injury. We would recommend the use of ultrasound in future undertakings of D&E on patients with uterus didelphys, as the orientation of the uterus may not be consistent with expectations based on anatomically normal patients. Even with the use of ultrasound guidance, this can be a more technically challenging procedure and these patients may be best served by referral to specialized complex family planning providers.

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Laparoscopic or Open Appendectomy Following Acute Appendicitis during Pregnancy: A Systematic Review

By Priscila Scalabrin Longo, Ansara Alcantara Durante, Felipe Placco Araujo Glina, Karina Scalabrin Longo & Diego Ferreira de Andrade Garcia

UNISA - Universidade de Santo Amaro

Abstract- Objective: To evaluate the best surgical approach for the appendicitis during pregnancy in all trimesters.

Methods: Systematic review conducted in MEDLINE® Cochrane, EMBASE and LILACS database up to February 16th, 2020. Articles were selected according to study type, type of intervention and outcomes. Articles were selected by more than one researcher based on title, abstract and full text. The SIGN checklist was used for bias assessment.

Results: A total of 55 articles were retrieved from MEDLINE® via Pubmed, Cochrane, LILACS and EMBASE. Sixteen studies were elected for full text reading, and fifteen of them were selected for the concluding paper evaluation.

Conclusion: Articles revealed higher efficacy in the laparoscopic appendectomy when compared to conventional open appendectomy in all trimesters.

Keywords: acute appendectomy during pregnancy; laparoscopic appendectomy; open appendectomy.

GJMR-E Classification: NLMC Code: WQ 240

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Priscila Scalabrin Longo [α], Ansara Alcantara Durante [σ], Felipe Placco Araujo Glina [ρ], Karina Scalabrin Longo [ω] & Diego Ferreira de Andrade Garcia [¥]

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Keywords: acute appendectomy during pregnancy; laparoscopic appendectomy; open appendectomy.

I. Introduction

Acute appendicitis is the most frequent medical condition that requires surgical intervention during pregnancy. The incidence of acute appendicitis during pregnancy rages from 1.8 to 41 per 10 000 pregnancies, specially during the second trimester.

Pregnancy brings its own difficulties to the surgeon and to the anaesthesiologist, since the normal physiology of the body becomes altered[1].

The history, physical examination and laboratory results are essential for the accurate diagnosis of acute appendicitis. The best signs include pain that starts in the right lower quadrant or that irradiates from peri umbilical to the right lower quadrant. Besides the fact that the patient can be nauseated, misinterpreting the clinic with pregnancy emesis. The Alvarado Score, which includes the criteria migration of pain, anorexia, nausea, tenderness in right lower quadrant, rebound pain, elevated temperature, leucocytosis and shift of white blood cell count to the left, stratifies patients according to their diagnosis and risks[2].

According to the paper Appendectomy: Diagnostic Criteria and Hospital Performance from E. J. Thomas and C. Barber Mueller, appendicitis that is untreated or belatedly treated carries a high mortality risk. Therefore the appendectomy is an attempt to intervene in the progression of obstruction, infection, perforation, peritonitis, and death of patients. The mortality rate in the study varied between 1: 850 and 1: 2300 cases with acute appendicitis.

Although antibiotic treatment has proven to be effective in treating select patients with acute appendicitis, appendectomies remain the standard treatment of choice[3].

Several controversies about the ideal procedure are reported in the medical literature. Despite the significant number of articles that consider both the laparoscopic and open appendectomy as safe procedures, there is no consensus on the optimal surgical management of acute appendicitis in pregnancy nowadays[4].

The safety of the laparoscopic approach for pregnant women has been widely discussed in the past ten years. Most of those studies were single institution researches or with limited number of patients. Some provided low-grade evidence that laparoscopic approach in pregnant women might be associated with a greater risk of fetal loss, of preterm delivery and technical difficulties in the laparoscopic appendectomy[5].

This study was designed to identify surgical and obstetrical outcomes of Laparoscopic Appendectomy (LA) and conventional Open Appendectomy (OA) in pregnant patients with acute appendicitis during all trimesters.

II. Methods

a) Inclusion and exclusion criteria

Selected articles were randomised clinical trials published in English, Portuguese or Spanish, which comprehended pregnant women with acute appendicitis. Interventions consisted on laparoscopic appendectomy and were compared to conventional open appendectomy. Surgical and obstetrical outcomes were included, such as hospital stay, medical expenditure, operation time, gestational age, Apgar scores, birth weight and height, delivery type, time to first flatus, time to oral intake, return to daily activities, need of post operative analgesics, occurrence of

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negative appendectomies, maternal and neonatal morbidity and mortality. Different outcomes were excluded, such as unusual preoperative and postoperative complications, and insignificant obstetric outcomes.

b) Databases

Articles were retrieved from Medline via Pubmed, Cochrane, Lilacs and Embase search until/on February 16th, 2020. The following search strategy was used: ''(acute appendicitis AND pregnancy AND laparoscopic appendectomy AND open appendectomy)''.

c) Selection

Selection process

Eligibility assessment was performed independently by two reviewers (PSL and AAD), in a non-blinded standardised fashion. Disagreements between reviewers were resolved by consensus. Studies were considered at each stage (title, abstract and full text) of the process for the sake of better selection. Study authors were not contacted.

Checklist

The Scottish Intercollegiate Guidelines Network (SIGN)[6] checklist was used to evaluate clinical trials.

d) Critical evaluation

Biases

Selection, performance, detection, mis-understanding and reporting were considered biases.

To ascertain the validity of eligible clinical trials, independent and reliable peer reviewers were selected. They determined the adequacy of allocation concealment and blinding of patients, health care providers, data collectors and outcome assessors. All items above were contemplated in the SIGN[6] evaluation questionnaire.

Extraction results

Results were selected from all articles evaluating surgical and obstetrical outcomes, such as hospital stay, medical expenditure, operation time, gestational age, Apgar scores, birth weight and height, delivery type, time to first flatus, time to oral intake, return to daily activities, need of post operative analgesics, occurrence of negative appendectomies, maternal and neonatal morbidity and mortality. They were evaluated with mean and standard deviation.

III. Results

a) Study selection

PubMed, Cochrane, Lilacs and Embase database search yield 55 records in Medline and in other index, with no duplicates found. Of these, 36 records were screened after title analyses, 16 full-text articles assessed for eligibility after abstract analyses and 15 studies included in qualitative synthesis after full-text reading. One article was excluded for not describing clinical articles.

A total of 15 articles were retrieved. There were no textbooks and dissertations. The search and selection strategy employed was displayed in the Prisma[7] flowchart (Figure 1).

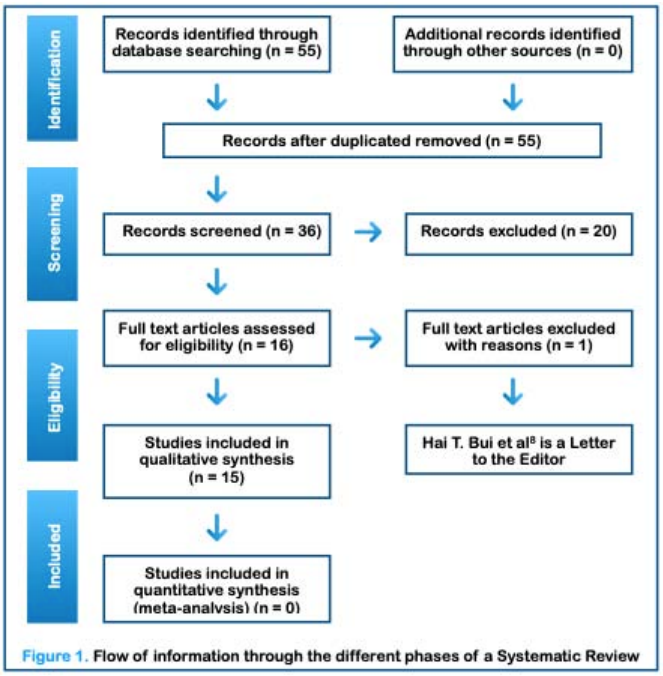

Figure 1. Flow of information through the different phases of a Systematic Review

Table 1. Study Description

Articles	Study Type	Follow-up (years)	LA (patients)	OA (patients)	Maternal Age	Maternal BMI	Parity	Gestational Age at Delivery	Gestational Trimester at Surgery	Complications Analysed	Phases of Appendicitis
Kwon H et al [9]	RCT	8	35	27	D	D	D	D	1 Tri: 15 LA, 7 OA 2 Tri: 15 LA, 17 OA 3 Tri: 5 LA, 3 OA	Wound Infection, Preterm Labor, Preterm Delivery	ND
Maimaiti A et al [10]	RCT	4	7	19	D	ND	D	ND	1 Tri: 1 LA, 4 OA 2 Tri: 6 LA, 9 OA 3 Tri: 0 LA, 6 OA	Clavein-Dindo Score	AA: 1 LA, 4 OA PA: 5LA, 9 OA CA: 1 LA, 6 OA
Segev L et al [11]	RCT	14	50	42	D	ND	ND	D	Total: 19, OA: Mean 24 weeks LA: Mean 16 weeks	Clavein- Dindo Score	AA: 59 (36 LA, 23 OA) CA: 11 (4 LA, 7 OA)
Laustsen JF et al [12]	RCT	12	19	25	D	ND	ND	ND	1 Tri: 8 LA, 0 OA 2 Tri: 7 LA, 20 OA 3 Tri: 4 LA, 5 OA	Wound Infection, Abscess, Haematoma	AA: 16 (3 LA,13 OA), PA: 20 (13 LA,7 OA), CA: 8 (3 LA, 5 OA)
Karaman E et al [13]	RCT	5	12	36	D	D	D	ND	1 Tri: 1 LA, 2 OA 2 Tri: 7 LA, 12 OA 3 Tri: 4 LA, 22 OA	Wound Infection, Intra-abdominal Abscess	AA: 46 LA/OA PA: 2 LA/OA
Yoo KC et al [14]	RCT	7	24	56	D	D	ND	D	1 Tri: 7 LA, 14 OA 2 Tri: 15 LA, 29 OA 3 Tri: 2 LA, 13 OA	Wound Infection, Intra-abdominal Abscess	AA: 55 LA/OA CA: 11 LA, 14 OA
Aggenbach L et al [15]	RCT	20	7	14	D	ND	D	D	AA: 1 Tri: 3 2 Tri: 7 3 Tri: 6	Clavein- Dindo Score	Normal appendix: 4 Non perforated: 9 Perforated: 3
Cheng HT et al [5]	RCT	5	128	653	D	ND	ND	D	ND	Pre Term Labor, Abortion, Need of Cesarean Section	Not complicated: 544 OA, 116 LA, Complicated: 109 OA, 12 LA
Chung JC et al [16]	RCT	4	22	39	D	D	ND	D	1 Tri: 6 LA, 8 OA 2 Tri: 13 LA, 20 OA 3 Tri: 3 LA, 11 OA	Intra-abdominal Abscess, Wound Infection	ND
Peled Y et al [17]	RCT	9	26	59	D	ND	D	D	ND	Fever > 38^{O}C, Presence of Uterine Contractions	Normal appendix: 5 LA, 10 OA, AA: 19 LA, 37 OA, Perforated: 1 LA, 10 OA
Kapan S et al [18]	RCT	2	10	10	D	ND	ND	ND	ND	ND	ND
Eom JM et al [19]	RCT	10	15	28	D	D	D	D	LA: Median 15 weeks, OA: Median 17 weeks	Pre-Term Deliveries, Uterine Contractions, Abscess, Fever	AA: 11 LA, 22 OA, Gangrenous: 2 LA, 1 OA, Perforated: 2 LA, 5 OA
Kaplan M et al [20]	RCT	3	50	50	D	D	ND	ND	ND	Pain, Wound Infection, Chronic Pain	AA: 95 LA/OA Perforated: 5 LA/OA
Sadot E et al [21]	RCT	9	48	17	D	ND	ND	D	LA: 18.1 ± 7.4 weeks OA: 24.3 ± 6.7 weeks	Wound Infection, Abscess, Postoperative Contractions	G1 Acute: 57% G2 Gangrenous: 3% G3 Perforated: 4,6% G4 Abscess 6%
Kirshtein B et al [22]	RCT	10	23	19	D	ND	ND	D	1 Tri: 23 LA/OA 2 Tri: 19 LA/OA 3 Tri: 0 LA/OA	Wound Infection, Abscess, Urinary/ Pulmonary/ Obstetric Complications	AA: 34 LA/OA CA: 7 LA, 1 OA

RCT: Randomised Clinical Trial; P: Pregnant women; AA: Acute Appendicitis; LA: Laparoscopic Appendectomy; OA: Open Appendectomy; D: Described; ND: Not Described; AA: Acute Appendicitis; PA: Phlegmnous Appendicitis; CA: Complicated Appendicitis

Table 2. The Scottish Intercollegiate Guidelines Network (SIGN)[6] checklist

Articles for the SIGN Checklist	1.1) The study addresses an appropriate and clearly focused question	1.2) The assignment of subjects to treatment groups is randomised	1.3) Adequate concealment method is used	1.4) Subjects and investigators are kept ''blinded'' to treatment allocation	1.5) Treatment and control groups are similar at the start of the trial	1.6) The only difference between groups is the treatment being investigated	1.7) Relevant outcomes are measured in a standardised, valid and reliable way	1.8) What percentage of individuals or clusters recruited into each treatment arm of the study dropped out before study completion?	1.9) All studies are analysed in groups to which they were randomly allocated (often referred to as intention to treat analysis)	1.10) For studies carried out in more than on site, results are comparable for all sites	2.1) How well was the study performed to minimize bias?
Kwon H et al [9]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Maimaiti A et al [10]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Segev L et al [11]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Laustsen JF et al [12]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Karaman E et al [13]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Yoo KC et al [14]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Aggenbach L et al [15]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE

Cheng HT et al [5]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Chung JC et al [16]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Peled Y et al [17]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Kapan S et al [18]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Eom JM et al [19]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Kaplan M et al [20]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Sadot E et al [21]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE
Kirshtein B et al [22]	YES	YES	CANNOT SAY	CANNOT SAY	YES	YES	YES	NOT DESCRIBED	YES	YES	ACCETABLE

Table 3. The Survey Summary

Articles	Hospital Stay (days) (OA/LA)	Operation Time (minutes) (OA/LA)	Post Operative Complications (OA/LA) (patients)	Estimated Blood Loss (OA/LA) (cc or mL)	Negative Appende-ctomies (OA/LA) (patients)	Time to First Flatus (OA/LA) (days)	Apgar Score (OA/LA)	Abortion (OA/LA) (patients)
Kwon H et al [9]	7.2 ± 3.0 vs 5.5 ± 3.0, p = 0.03	67.0 ± 31.0 vs 73.5 ± 40.4, p = 0.49	8/27 (29.6%) vs 4/35 (11.5%)	64.8 ± 55.1 vs 64.3 ± 39.4 cc, p = 0.96	X	X	X	X
Maimaiti A et al [10]	6.47 ± 2.72 vs 4.14 ±1.77, p = 0.021	65.21 ± 26.58 vs 42.14 ± 8.63, p = 0.003	Score 7/19 (36,8%) vs 2/7 (28,5%), p = 0.430	12.53 ± 9.95 vs 12.14 ± 8.09 mL	X	2.37 ± 1.11 vs 1.43 ± 0.53, p = 0.009	8.2/10 (82%) vs 8.7/10 (87%), p = 0.53	1/19 (5,2%) vs 0/7 (0%)
Segev L et al [11]	5 vs 3, p < 0.001	60 vs 57, p = 0.8	Score: 10/42 (23,8%) vs 4/50 (8%), p = 0.04	X	11/42 (26,1%) vs 9/50 (18%)	X	9/10 (90%) vs 9/10 (90%), p = 0.7	2/42 (4,7%) vs 2/50 (4%), p = 0.7
Laustsen JF et al [12]	5.5 vs 2.6, p = 0.004	49 vs 69, p = 0.002	9/25 (36%) vs. 1/19 (5.26%), p = 0.03	X	52% vs 16%, p = 0.02	X	8.2/10 (82%) vs 8.7/10 (87%)	X
Karaman E et al [13]	4.28 ± 3.31 vs 3.25 ± 2.45, p = 0.004	38.61 ± 11.5 vs 49.42 ± 11.38, p = 0.007	1/36 (2,7%) vs 0/12 (0%)	X	X	4.0 ± 1.6 vs 2.3 ± 0.3, p = 0.032	8.11 ± 1.62 vs 8.42 ± 1.08, p = 0.552	1/36 (2.7%) vs 1/12 (8.3%), p = 0.34
Yoo KC et al [14]	8.1 (10.4%) vs 5.1 (2.1%), p = 0.044	53.9 (19.2%) vs 52.8 (20.8%), p = 0.815	6/56 (10.7%) vs 4/24 (16.6%), p = 0.477	X	X	2.3 (0.9%) vs 2.0 (1.4%), p = 0.391	X	4/56(7.1%) vs 3/24 (12.5%), p = 0.350

Aggenbach L et al [15]	6.5	60	6/21(28,5%)	X	6/21 (28,5%)	X	X	X
Cheng HT et al [5]	5.5 vs 3.8, p = 0.0005	X	16.7% vs 9.4%, p < 0.05	X	X	X	X	14.34/653 (2,1%) vs 13.88/128 (10,8%)
Chung JC et al [16]	6.9 ± 3.7 vs 4.2 ± 2.9, p = 0.043	47.3 ± 14.7 vs 44.2 ± 16.4, p = 0.48	2/39 (5.1%) vs 1/22 (4.5%), p = 0.76	X	9.8% (10.3% vs 9.1%)	4.0 ± 1.7 vs 2.4 ± 0.4, p = 0.034	9.3 ± 0.2 vs 9.2 ± 0.1, p = 0.70	0/39 (0%) vs 0/22 (0%)
Peled Y et al [17]	3.8 ±1.3 vs 3.7 ± 1.1, p = 0.5	X	15/59 (25.4%) vs 1/26 (3.8%), p = 0.009	X	X	X	8.7 ±1.0 vs 8.9 ± 0.2, p = 0.3	0/59 (0%) vs 1/26 (3.8%), p = 0.3
Kapan S et al [18]	1.1	51.7 vs 56.5	X	X	0/10 (0%) vs 2/10 (20%)	X	X	0/10 (0%) vs 0/10 (0%)
Eom JM et al [19]	5 (3-17) vs 4 (3-7), p = 0.102	55 vs 27.5, p = 0.001	7/28 (25%) vs 1/15 (6.6%), p = 0.224	X	0/28 (0%) vs 0/15 (0%)	X	X	0/28 (0%) vs 0/15 (0%)
Kaplan M et al [20]	75.06 ± 35.14 vs 55.80 ± 20.97 hrs, p < 0.05	49.41 ± 11.76 vs 56.25 ± 10.9, p < 0.05	X	X	7.2%	X	X	X
Sadot E et al [21]	4.2 vs 3.4, p = 0.001	55 ± 25 (17%) vs 54 ± 34 (46%), p = 0.34	X	X	24% (18% vs 27%), p = NS	X	9±0.0 vs 8.91 ± 0.29, p = 0.23	0% (0/16) vs 2,4% (1/41), p = 1.0
Kirshtein B et al [22]	1.4 ± 0.5 vs 2.4 ± 1.7, p = 0.023	28.9 ± 9.2 vs 29.9 ± 6.3, p = NS	0/19 (0%) vs 0/23 (0%)	X	5/19 (26,3%) vs 13/23 (56,5), p = NS	X	8.7/10 (87%) vs 8.9/10 (89%), p = NS	1/19 (5,2%) vs 1/23 (4,3%), p = NS

b) Study characteristics

All fifteen studies selected for review were randomised controlled trials published in English or Portuguese. Articles can be found in table 1, along with descriptions of sample size, follow-up time, type of access, type of study and patient characteristics.

Risk of bias within studies

Potential study biases are shown in table 2. The SIGN[6] checklist was used to access methodological quality and data reliability in selected studies.

Results of individual studies (the survey summary in Table 3)

Kirshtein B et al[22] from 2009 is a retrospective study from 1997 to 2007 that included 42 pregnant women (mean age 24 years, range of gestation 5-25 weeks), who underwent appendectomy for suspected acute appendicitis (23 LA and 19 OA) in the department at Soroka University Medical Center, Beer Sheva, Israel. Five women with normal preoperative abdominal sonography had acute appendicitis (3 LA, 2 OA). The LA was performed more often by senior surgeons (70% cases) and OA more commonly done by residents (47% cases). Although the length of postoperative hospital stay was slightly prolonged after LA (2.4 days vs 1.4 day), LA was associated in this study as a safe and effective procedure during all trimesters of pregnancy and with good maternal and fetal outcomes.

Sadot E et al[21] from 2009 is a hospital based retrospective review of 65 patients from 1999 to 2008 from the Mount Sinai Hospital and Elmhurst Hospital Center. There were 65 patients (48 LA and 17 OA). The use of LA vs OA significantly increased in the first trimester (100% vs 0%, $p<0.001$) and second trimester (73% vs 27%, $p<0.001$), and OA was used more frequently in the third trimester patients (71% vs 29%, p=NS). Significance was demonstrated in mean length of hospital stay in the LA vs OA group (3.4 days vs 4.2 days, p=0,001). No maternal mortalities occurred. According to the study, while methodological limitations preclude a definite recommendation, laparoscopy appears to be a safe, feasible and efficacious approach for pregnant patients with acute appendicitis in all trimesters.

Kaplan M et al[20] from 2009 is a study of 100 pregnant women who underwent appendectomy (50 LA and 50 OA) at Kirikkale Yuksek Ihtisas Hospital during 2000 and 2003. The patients were randomly assigned to each group and advantages of LA included significantly shorter hospital stay (55.80±20.97 hours vs 75.06±35.14 hours), gastrointestinal quality of life index (85.88±9.73 cases vs 101.30±9.31 cases) and quality of life in the long term (95.14±8.45 cases vs 120.36±10.25 cases). The gastrointestinal quality of life index was developed by Eypasch et al and is not only a measure of the personal perception of the disease but also its emotional, physical and social effects. LA showed to be a safe method in all trimesters, a better quality of life in the early and late period and a shorter hospital stay.

Eom JM et al[19] from 2012 is a retrospective study from 2000 to 2010, with 43 patients analysed (15 LA and 28 OA) in the Kangbuk Samsung Hospital. The LA group, when compared to the OA group, had a hospital stay of 4 days vs 5 days (p=0.102), operating time of 27.5 min vs 55 min (p=0.001), haemoglobin change of 1.0 mg/dL vs 0.8 mg/dL (p=0.269), return to bowel activity of 46 hours vs 38 hours (p=0.362), use of postoperative analgesics of 6.7 cases vs 39.2 cases (p=0.033) and postoperative complications were 6.7% vs 25.0% (p=0.224), such as preterm deliveries, postoperative uterine contractions, intra peritoneal abscess and post-operative fever. The study showed that the LA can be a safe and effective method for treating acute appendicitis during the first and second trimestres of pregnancy. The third trimester remained controversial in this study.

Kapan S et al[18] from 2013 included a retrospective study of 20 patients (10 LA and 10 OA) from 2009 to 2011 in the Emergency Surgery Clinic in the USA. All patients had abdominal pain, 13 had nausea and vomiting associated. Mean Alvarado Score was 7.7 points (7-9), mean leukocyte count was 13920 WBCs per microliter (7200-22300). Mean age of patients was 26 years (19-35), mean gestational age at LA was 17.6 weeks (4-33) and there were 6 patients in the first trimester, 10 patients in the second trimester and 4 patients in the third trimester of pregnancy. This study was inconclusive on choosing one approach and defended that the type of surgery (LA vs OA) depends on the surgeon's experience and preference.

Peled Y et al[17] from 2014 is a retrospective cohort study in a tertiary university affiliated referral medical center from 2000 to 2009. There were 83510 deliveries that occurred during the study period, in which 85 cases (0.10%) with acute appendicitis were eligible for the study (26 LA and 59 OA). There was a significant difference in the mean gestational age at surgery between the 2 groups (14.6 weeks in LA vs 19.3 weeks in OA, p=0.009). Post-operative complications such as fever>38°C or presence of uterine contractions rate was higher in the OA vs LA (25,5% vs 3.8%, p=0.009). In this study LA appeared to be a safe procedure for acute appendicitis during all trimesters of pregnancy, with less post-operative complications compared to open appendectomy.

Chung JC et al[16] from 2013 studied retrospectively 61 patients (22 LA and 39 OA) from 2007 to 2011 at Soonchunhyang University Bucheon Hospital. LA had shorter time to first flatus (2.4±0.4 days vs 4.0±1.7 days, p=0.034), earlier time to oral intake (2.3±1.6 days vs 4.1±1.9 days, p=0.023) and shorter postoperative hospital stay (4.2±2.9 days vs 6.9±3.7 days, p=0.043). In this study LA is contemplated as a

safe and effective procedure in all trimestres of pregnancy and should be considered the standard treatment alternative to OA.

Cheng HT et al[5] from 2014 was based on the Natural Health Insurance Research Database, from 2005 to 2010. There were 859 pregnant women with acute appendicitis, 653 OA, 128 LA and 78 antibiotics-treatment only. The non-operated group had the highest risk of preterm labor. Risk of abortion following acute appendicitis was antibiotics-only group OR=31.37 (95% CI 13.12-75.01), OA group (OR= 14.34, 95% CI 7.70-26.71) and LA group (OR=13.88, 95% CI 5.50-35.04). This study showed that LA can be performed safely in pregnant patients in all trimesters without bringing additional maternal or foetal complications when compared to the OA group.

Aggenbach L et al[15] from 2015 is a retrospective study, with case reports at the University Medical Center in Groningen, a tertiary care hospital, between 1990 and 2010. There were 21 patients (7 LA, 14 OA) included and 2 cases of maternal morbidity. Premature delivery occurred in 2 out of 6 cases with perforated appendicitis and 2 out of 6 cases following a negative appendectomy. Representative results regarding safety issues and outcome of surgical technique could not be reported based upon their limited study sample size.

Yoo KC et al[14] from 2016 retrospectively revised medical records of pregnant woman who underwent appendectomy between 2008 and 2015 at 6 hospitals affiliated to Hallym University. A total of 80 patients were evaluated (24 LA and 56 OA). Length of hospital stay was shorter in the LA group (5.1 days vs 8.1 days, p=0.044) There was no significant difference in overall obstetric poor outcome, such as preterm delivery (8.3% vs 7.1%, p=1.000) and fetal loss (12.5% vs 7.1%, p=0,350). Furthermore, this study showed that LA can be safely performed during any trimester of pregnancy.

Karaman E et al[13] from 2016 studied two tertiary referral centres of Yuzuncu Yil and Kafkas University in a retrospective study from 2010 to 2015. There were 48 patients (12 LA, 36 OA). The LA group had shorter hospital stay (3.25 ±2.45 days vs 4.28±3.31 days, p=0,004), earlier mobilisation time (8.1±2.2 hours vs 10.1±1.6 hours, p=0.025) and shorter time to first flatus (2.3±0.3 days vs 4.0±1.6 days, p=0,032). The OA had statistically shorter operation time than LA (38.61±11.5 min vs 49.42±11.38 min, p=0,007). This study showed that LA appears to be as safe and effective as OA in pregnant patients during all trimesters, without increasing adverse perinatal outcomes.

Laustsen JF et al[12] from 2016 is a retrospective review of all patients who underwent appendectomy during pregnancy from 2000 to 2012, with 44 patients (19 LA, 25 OA) in Odense University Hospital, Denmark. It was noticed in the LA group longer operation time (69 min vs 49 min, p=0,002), but fewer complications (wound infection, abscess and haematoma), shorter hospital stay (2.6 days vs 5.5 days, p=0,004) and lower rate of negative appendectomies (16% vs 52%, p=0,02). In this study, LA is considered safe for both mother and foetus during pregnancy, not depending on gestational age, and also associated with low risk of post-operative complications.

Segev L et al[11] from 2016 is a large contemporary cohort study, that reviewed all women who underwent appendectomy during pregnancy in a single university-affiliated, tertiary medical center during 2000 to 2014. There were 92 patients who met the criteria, 50 cases (54%) in LA and 42 cases (46%) in OA. The laparoscopic group had lower median gestational age at surgery (16 weeks vs 24 weeks, p<0,001), shorter median hospital stay (5 days vs 3 days, p<0,001) and lower rate of postoperative complications (8% vs 24%, p=0,04). There was no difference at Apgar scores, preterm delivery and fetal loss. This study defends LA as a safe procedure and with better surgical outcomes during pregnancy in all trimesters.

Maimaiti A et al[10] from 2017 compared 26 pregnant women from 2012 to 2016 retrospectively, with 7 patients in LA and 19 in OA group from the First Affiliated Hospital of Xinjiang Medical University. Median gestational period was 21,5 weeks (5-33 weeks) and median age of patients was 28 years (19-39 years). There was significantly shorter operation time (42.14±8.63 min vs 65.21 ±26.58 min, p=0,003), hospital stay (4.14±1.77 day vs 6.47±2.72 day, p=0,021) and earlier recovery of gastrointestinal function in the LA group vs the OA group. This study appoints LA as the preferred approach compared to OA, without increased risks for the foetus or the mother.

Kwon H et al[9] from 2018 is a retrospective study between 2008 and 2016 that included 62 patients, 35 cases (56,5%) in the LA group and 27 cases (43,5%) in the OA group in the Obstetrics and Gynecology Department of Dongguk University Ilsan Hospital, Korea. The study showed that LA had shorter hospital stay (5.5 days vs 7.2 days, p=0,03) and lower pain on postoperative score (4 points vs 2.4 points, p<0,01) than OA. No significant differences in operative and surgical complications were found. In this study LA was considered to be feasible and safe in all trimesters without adverse effects on pregnancy.

IV. Discussion

a) Summary of evidence

The hypothesis that LA would have a better impact on surgical and obstetrical outcomes compared to OA was confirmed by literature data, which offered high quality, robust evidence revealing great improvement in the laparoscopic approach during all trimesters of pregnancy. Only randomised clinical trials were included in this study. Up until now it was believed that LA and OA would have similar rates of surgical and

obstetrical outcomes. However, the selected studies of this systematic review disclosed otherwise.

Kapan S et al[18] from 2013 said it has been more than a hundred years since Balber stated that ''the mortality of appendicitis complicating pregnancy is the mortality of delay''. Delay in the diagnosis of appendicitis is associated with significant complications. Therefore the pathology must be diagnosed and treated with precision, accuracy and promptitude. According to the paper, acute appendicitis has a challenging diagnosis in the pregnant women and early surgical intervention should be performed with any suspicion.

Sadot E et al[21] from 2009 showed that it is likely not the surgical approach itself but the underlying diagnosis combined with maternal factors that determine the risk for pregnancy complications. One of the benefits of the laparoscopic approach is the diagnostic ability to identify other intra abdominal pathologies which may mimic appendicitis and harbour pregnancy risks.

Kaplan M et al[20] from 2009 also showed that the laparoscopic method has the advantage of being a diagnostic procedure for other pathologies, when negative appendectomy arrives at the surgeon's hands, which is hardly manoeuvred in the open method.

When Eom JM et al[19] from 2012 compared the LA to the OA group, they pointed out the necessity of general anaesthesia, the possibility of incidental injury of the gravid uterus with a veress needle or a trocater, the potential effects of increased intra-abdominal pressure on the uteroplacental circulation, concerns related to the use of CO2 and the technical difficulties found in the end of the third trimester of pregnancy. The study supported the idea that LA could not be performed with a gravid uterus large enough to occupy the entire abdominal cavity, such as in a multifetal pregnancy or during the end of the third trimester.

Cheng HT et al[5] from 2014 exemplifies what many studies evaluated in this paper showed: the laparoscopic approach has several well-known advantages over the open technique, such as a better visualisation of the abdominal cavity, fewer wound infections, less post-operative pain, shorter hospital stay and earlier return to daily activities. They also found that LA had reduced and fewer risks for maternal complications compared to OA, being considered a safe and preferable technique in pregnant women with acute appendicitis in all trimesters of pregnancy.

V. Conclusion

There is evidence to support the hypothesis that laparoscopic appendectomy has less impact on surgical and obstetrical complications as compared to conventional open appendectomy during the whole period of pregnancy. However, more studies ought to be promoted to further support the evidence presented.

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15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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