Section: Obstetrics and Gynaecology

Original Research Article

A STUDY TO EVALUATE MATERNAL AND PERINATAL OUTCOME IN TWIN PREGNANCY

Madugula Harika[1], Sonal Sahni[2], Archana Thakur[3], Jagmohan Singh Dhakar[4]

[1]Post graduate student, Department of Obstetrics and Gynaecology, NSCB Medical College & Hospital, Jabalpur, MP India
[2]Associate Professor, Department of Obstetrics and Gynaecology, NSCB Medical College & Hospital, Jabalpur, MP India
[3]Assistant Professor, Department of Obstetrics and Gynaecology, NSCB Medical College & Hospital, Jabalpur, MP India
[4]Assistant Professor (Statistics), Department of Community Medicine, Virendra Kumar Sakhkecha Government Medical College, Neemuch

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Corresponding Author:
Dr. Harika Yadav,
Email: madugulaharika11@gmail.com

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Abstract

Background: Twin pregnancies have a substantial impact on both maternal and perinatal outcomes worldwide, adversely affecting health outcomes of mother and newborns. The objective is to assess maternal and perinatal outcomes in twin pregnancies. **Materials and Methods:** A prospective observational study was conducted to assess maternal and perinatal outcomes in twin pregnancies at the Department of Obstetrics and Gynecology, NSCB Medical College & Hospital, Jabalpur, from 1st July 2022 to 31st December 2024. **Result:** Maternal complications included a significant incidence of anemia and pregnancy-induced hypertension followed by gestational diabetes. Polyhydramnios and preterm delivery were seen in a substantial proportion of pregnancies. premature rupture of membranes (PROM) and postpartum hemorrhage were the most frequent intrapartum and peripartum complications noted in our study. Neonatal outcomes highlighted a high incidence of NICU admissions, especially for the second twin and mean birth weight was 2000 to 2500gms.Majority of pregnancies resulted in live births, although there was a notable incidence of neonatal deaths within the first week of life. Fetal growth restriction (FGR) affected nearly a quarter of the pregnancies, and single intrauterine fetal demise was reported in a few pregnancies. **Conclusion:** The findings indicate a high incidence of preterm deliveries, NICU admissions, and maternal complications, underscoring the high-risk nature of twin gestations. The prevalence of conditions such as pregnancy-induced hypertension, anemia, and intrauterine growth restriction was notably higher in twin pregnancies compared to singleton pregnancies. Additionally, the study revealed that cesarean sections were the most common mode of delivery, reflecting the complexities and risks involved in managing twin births.

INTRODUCTION

Twin pregnancy the findings indicate a high incidence of preterm deliveries, NICU admissions, and maternal complications, underscoring the high-risk nature of twin gestations. The prevalence of conditions such as pregnancy-induced hypertension, anemia, and intrauterine growth restriction was notably higher in twin pregnancies compared to singleton pregnancies. Additionally, the study revealed that cesarean sections were the most common mode of delivery, reflecting the complexities and risks involved in managing twin births.

Twin pregnancies have a substantial impact on both maternal and perinatal outcomes worldwide, adversely affecting health outcomes of mother and newborns. The global incidence of twin pregnancies has risen significantly over recent decades, primarily attributed to the increased use of fertility treatments and assisted reproductive technologies (ART), increase in the maternal age at childbirth. The incidence of twin pregnancy is approximately 1 out of 52 pregnancies, accounting for 1.9% or 19 per 1,000 live -births.[1]

In India, the prevalence of twin pregnancies has similarly increased, driven by the widespread adoption of ART and fertility drugs. The prevalence

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rate ranges from less than 8 twin pregnancies per 1000 births in the East, South east Asia and India. The higher rates of twin pregnancies are found in Nigeria and lowest occur in Japan. This difference is mainly due to Dizygotic twin pregnancies since the prevalence of monozygotic pregnancies is constant ranging from 3.5 to 4 per 1000 births. Although comprehensive national data are sparse, regional studies indicate a rising trend in twin births, mirroring global patterns.[2] This increase poses significant public health challenges, given the higher risk of complications associated with twin pregnancies.

Compared to singleton pregnancies, twins have a fivefold increased risk of dying within the first year of life. Mothers of twins also face heightened risks due to complications such as anemia, hypertensive disorders, antepartum hemorrhage, postpartum hemorrhage and gestational diabetes, compared to only 0.3% for singleton pregnancies. Maternal death associated with twin pregnancy is 2.5fold higher than in singleton pregnancy. These risks necessitate vigilant antepartum, intrapartum, and postpartum care to manage potential complications effectively.

Twin pregnancies, although constituting a small fraction of total live births, account for a disproportionately high percentage of adverse perinatal outcomes. These include low birth weight, prematurity, intrauterine growth restriction, birth trauma, asphyxia, congenital anomalies, and conditions unique to twin pregnancies such as twin-to-twin transfusion syndrome (TTTS) and twin anemia-polycythemia sequence (TAPS). Approximately one-fourth of twins require neonatal intensive care unit (NICU) admission, reflecting the heightened medical needs of these infants. The rate of perinatal mortality is two to three times higher in twins than among singleton pregnancies primarily due to prematurity, low birth weight babies fetal growth restriction and intrapartum anoxia.

The increased incidence of twin pregnancies poses unique challenges and necessitates specialised care to mitigate associated risks. Twin pregnancies can be classified as either monozygotic or dizygotic. Dizygotic twins result from the fertilisation of two separate ova by two different sperms, leading to dichorionic and diamniotic placentation. Monozygotic twins, on the other hand, can have various types of placentation depending on the timing of zygote division. This can result in dichorionic, monochorionic-diamniotic, monochorionic-monoamniotic, or conjoined twins, each with distinct clinical implications.[3]

Monochorionic twins, sharing a single placenta, are at higher risk for complications due to vascular anastomoses, which can lead to blood shunting between the twins. TTTS, affecting 10-15% of monochorionic twin pregnancies, has a poor prognosis if untreated.[4] In cases where one twin of a monochorionic pregnancy dies, the surviving twin faces increased risks of cerebral impairment and preterm delivery due to shared vascular connections. Even without TTTS, monochorionic twins have higher morbidity and mortality rates compared to dichorionic twins, with late fetal deaths reported beyond 32 weeks of gestation.[5]

Twin gestation presents hazards throughout the gestational period, including increased risks for prematurity, fetal loss, growth restriction, low birth weight, and sudden intrauterine demise of one or both twins. Monochorionic twins, in particular, face three to five times higher perinatal mortality compared to dichorionic twins.[6] The development of TTTS in 10-15% of monochorionic pregnancies underscores the need for vigilant monitoring and intervention to manage this life-threatening condition effectively.

The mode of delivery for each pregnancy be individualized depending on lie, position, amount of liquor, placental localization of both the fetus. The presenting twin must be in the favourable position for vaginal delivery to be considered. Twins with fetal growth discordance (greater than 20% difference in estimated fetal weight) preclude a patient from a vaginal delivery. All conditions that are contraindications to vaginal delivery such as cord prolapse, classical c-section, history of myomectomy, placenta previa or accreta spectrum, infections such as current herpes outbreak, or fetal distress should be considered for caesarean delivery. The delivery of twins is determined by twin type and maternal and fetal conditions at the time of labour.

MATERIALS AND METHODS

This prospective observational study was conducted women with twin pregnancies who attended the Department of Obstetrics and Gynecology at NSCB Medical College & Hospital Jabalpur (M.P.) during the study period i.e from 25th July 2022 to 1st January 2024. The study was approved by the institutional ethical committee.

Inclusion Criteria

Women with twin pregnancies who provided informed consent.

Exclusion Criteria

Singleton pregnancies.

Multifetal gestations involving triplets or more.

Twin pregnancies that were reduced to singleton.

Triplet pregnancies that were reduced to twin.

Sample Size

The sample size was calculated based on the prevalence of twin gestations using the formula for simple random sampling for an infinite population:

$n=z2\cdot p\cdot q/d2$ where

$z=1.96z=1.96$ at a 95%

Confidence limit, $p=1.9\%p=1.9\%$prevalence of twins in pregnancy ($p=0.019p=0.019$), $q=1-p=0.981q=1-p=0.981$, and $d=2\%d=2\%$ absolute error. The calculated sample size was 186.

Sampling Technique

A simple random sampling technique was used to select participants who met the inclusion criteria.

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Study Procedure

Women who met the inclusion criteria were enrolled in the study after obtaining informed consent. Patient information, including name and age, was recorded. A thorough clinical examination was conducted, and routine laboratory investigations, such as complete blood count, total leukocyte count, differential leukocyte count, blood grouping, and viral markers, were performed. Radiological investigations, including obstetric ultrasonography and color Doppler, were conducted to determine fetal presentation, type of twin pregnancy (monochorionic monoamniotic, dichorionic diamniotic, or monochorionic diamniotic), placental localization, amniotic fluid index, and any growth restrictions or complications in the twins.

Data Collection

Approval from the institutional ethical committee was obtained before data collection commenced. The purpose of the study was explained to all participants, and their identities were kept confidential. Written informed consent was obtained from all subjects. Data collection was carried out systematically for all patients who met the inclusion criteria.

Study Tools

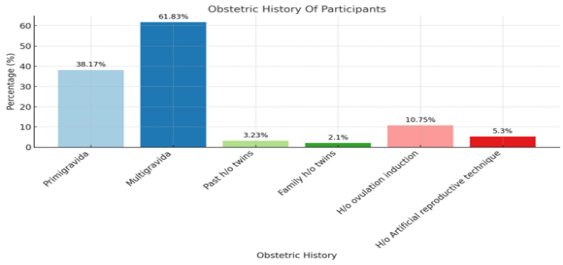
Data were collected using a predesigned proforma, which included sections for patient demographics, clinical examination findings, laboratory and radiological investigation results, and any complications observed.

Statistical Analysis

Data were recorded in a predesigned proforma and entered into Microsoft Excel. Statistical analysis was performed using SPSS version 21. Descriptive statistics were used to summarize the data. Chi-square test was used for finding the statistical significance. A p value less than 0.05 was considered as statistically significant.

RESULTS

The majority of participants (63.98%) were in the age group of 20-30 years, followed by 27.96% who were older than 30 years. Only 8.06% of the participants were younger than 20 years.



Most of the participants are multiparous (61.83%) and primi includes (38.17%) and H/o ovulation induction in the participants is (10.75%) and where as assisted reproductive technique corresponds to (5.3%) and past h/o twins in the study is 3.23% and family h/o twins is 2.1%

The majority (60.21%) were diamniotic monochorionic, followed by 29.56% dichorionic diamniotic, and 10.21% monochorionic and polyhydramnios includes 7.53% and discordant twins corresponds to 6.4% And IUGR includes 25.81% and there is no TTTS and TAPS in my study.

Table 1: Maternal Complications of Twin Pregnancy and Twins During Labour, The Time Interval Between Successive Twin Deliveries.

Complications	Frequency	Percentage
Premature rupture of membranes	78	41.94%
Preterm labour	60	32.26%
Anemia	70	37.63%
Gestational hypertension	74	39.78%
Eclampsia	7	3.76%
Gestational diabetes mellitus	22	11.83%
Antepartum hemorrhage (abruptio placenta)	9	4.84%
Single intrauterine fetal demise	3	1.61%
Placenta previa	`6	3.22%
Presentation		
Vertex-Vertex	105	56.45%
Breech-Vertex	32	17.20%
Vertex-Breech	24	12.90%
Breech-Breech	13	6.99%
Vertex-Transverse	7	3.76%
Breech-Transverse	5	2.69%
Mode of delivery		
Vaginal	70	37.63%
C-section	97	52.15%
1st twin vaginal and 2nd twin C-section	7	3.76%
Assisted breech delivery	12	6.4%
Time-Interval between successive twin deliveries		
<15minutes	163	87.63%
15 to 30 minutes	17	9.1%
>30 minutes	6	3.2%
Maternal Outcome		
Icu admission	34	18.2%
Near miss	26	13.97%
Maternal death	8	4.3%

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Total	186	100.00%

Premature rupture of membrane was the most frequently encountered complication seen in patients (41.94%), followed by preterm labour (32.26%), gestational hypertension (39.78%), anemia (37.63%), Gestational diabetes mellitus placenta (11.83%), Abruptio- placenta (4.84%), placenta previa (3.22%) and single intrauterine demise includes 1.61%. [Table 1]

The most common presentation was vertex-vertex (56.45%), followed by breech-vertex (17.20%) and vertex-breech (12.90%).

The majority (47.85%) delivered between 34 and 38 weeks, followed by 38.17% between 30 and 34 weeks. The majority of deliveries (52.15%) were C-sections, followed by 37.63% vaginal deliveries. Most of the twins delivered in interval less than 15minutes (87.63%) very few (3.2%) had a interval of more than 30minutes which finally resulted in delivery of second twin by C-section.

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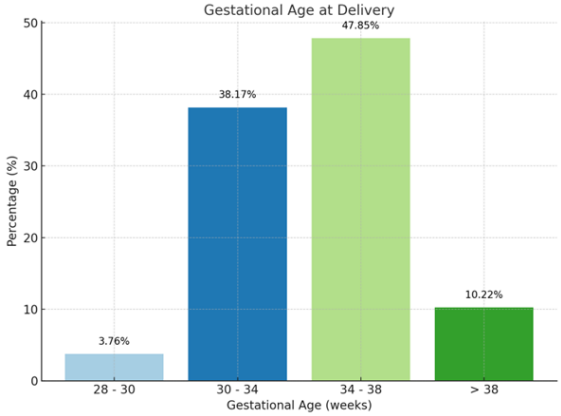
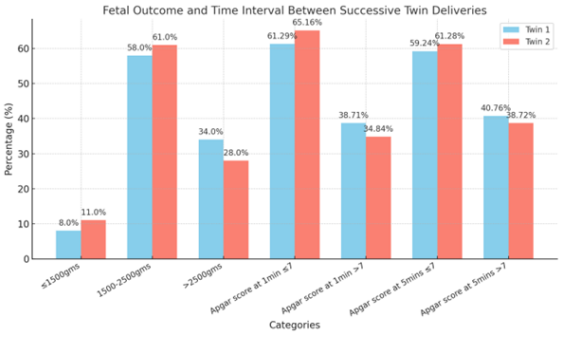


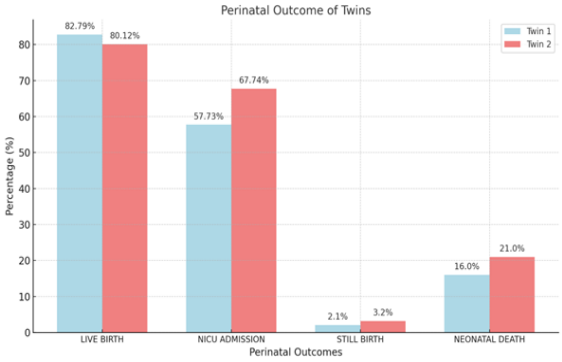
Table 2: Distribution of Participants According To Intrapartum And Peripartum Complications

	Frequency	Percentage
Postpartum hemorrhage	68	36.55%
Anemia	72	38.70%
Sepsis	4	2.1%
Subinvolution of uterus	2	1.07%
Lactational failure	58	31.11%

36.55% of the participants had postpartum hemorrrhage, and 38.70% had anemia and most of the patients 31.11% had lactational failure, and 2.1% developed sepsis and 1.07% had subinvolution of uterus. Sepsis and subinvolution of uterus with other comorbidities led to the mortality. [Table 2]



Twin 1 and (61%) of twin had birth weight of 1500 to 2500gms and 34% of first twin and 28% of second twin had birth weight of 2500 to 3500gms. And second (65.16%) had low apgar ≤7 compared to first twin (61.29%). And Apgar score ≤7 at 5minutes for first twin (59.24%) and second twin (61.28%).



There is good perinatal outcome in first twin compared to the second twin (67.74% of the twin2 needed NICU admission compared to Twin1 that is 57.73% and there are more still births in twin2 (3.2%) than twin 1 (2.1%).(21%) of the second Twin succumbed to death in the first week of life then first twin which is 16%.

DISCUSSION

During the current study period in our institute, out of total 17,045 deliveries, 186 were the twin deliveries. So overall Incidence of twins in this study was 1.2%. Incidence of twin delivery in present study

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is close to 1.49%.[7] A little higher incidence is noted by 17.6 per 1000 births.[8]

In this study higher incidence of twins is noted in the age group of 20-30 years of age (63.98%), followed by age above 30 years (27.96%) and less than 20 (86%). Similarly higher incidence in age group 20-29 year, 20 to 30 years is the peak reproductive age group, so the majority of patients were in this age group.[9]

In this study higher incidence is noted in multigravida (61.83%), while the remaining (38.17%) are primigravida. The incidence is compared to the study by Rami et al (2019) (47.7%) were primipara and (52.3%) were multipara. Similarly, (51.2%) multipara and 48.8% primipara were reported.[9]

In this study (15.59%) of the participants has h/o treatment for infertility i.e. ovulation induction and/or assisted reproductive technique. In a study it was reported (10%) of the patients conceived by Assisted reproductive technique whereas (23%) of the cases were reported.[9,10]

Premature rupture of membranes (PROM) was another prevalent complication, observed in (41.94%) of the pregnancies. PROM significantly increases the risk of preterm birth and infection, necessitating careful management to prolong the pregnancy and enhance neonatal outcomes. The high incidence of PROM in this study highlights the need for strategies to manage and mitigate the risks associated with premature membrane rupture.

In our study maternal complications are significant, with a high incidence of anemia and Hypertensive disorders of pregnancy. The distribution of medical complications in my study are -Hypertensive disorders of pregnancy (39.78%) followed by anemia (37.63%) and Gestational diabetes mellitus (11.83%).

These findings are consistent with other studies that report increased physiological demands and stress on the maternal body during twin pregnancies, leading to higher rates of such conditions.[11] Incidence of anemia in the study is corresponding to incidence reported by Chowdhury i.e. (35.8%),[12] and (50%) reported by Mehta CV (2020). Similar findings were observed by Brown et al (35.5%) of patients were anemic in twin gestation. Higher incidence of anemia was found by 60.8%.[7] Anemia in twin pregnancies is often due to the increased demand for iron and other nutrients.

PIH is more common in twin pregnancies due to the increased placental mass, which can lead to higher levels of placental hormones and subsequent vascular resistance. In our study (39.78%) of the participants had hypertensive disorders of pregnancy which is similar to the results observed 40% by Mehta CV (2020) whereas lesser incidence (24%)was seen by Patidar et al (2023).The results observed in this study are higher when compared to hypertensive disorders observed by Bengal et al and by Chowdhury et al i.e.(18%)and (22.6%) respectively. In our study (3.76%) patient had eclampsia in this study which lead to maternal mortality and morbidity and increased need of NICU admissions.

In our study incidence of APH was (4.84%) which is similar to that in studies of Mehta CV 4% and 4.2% in Patidar et al. There was 1.36 times higher risk of APH in twin pregnancies as compare to singleton group.

In our study, the commonest mode of delivery was LSCS (52.15%) followed by vaginal deliveries (37.63%) and assisted breech delivery (6.4%). The incidence of first twin delivered vaginally followed by second twin delivered by LSCS was (3.76%). The rate of caesarean delivery in this study is comparable to studies by Chowdhury and Sultana (49.1% and 56% respectively). Most of the twins delivered in interval less than 15minutes (87.63%) and few (3.2%) had a interval of more than 30minutes which resulted in delivery of second twin by LSCS. This increased interval between both the deliveries is observed in the patients who were referred late in labor and had malpresentations of the second twins. Similar results of higher incidence of LSCS deliveries was seen in study (63.3%) by Mehta CV (2020) and (54%) by Patidar et al (2023). To reduce perinatal risk, the delay between the two deliveries should be minimized.

In this study Postpartum hemorrhage was seen in (24.19 %) of the participants. In the study of Patidar et al the reported cases were (16.6%) and Mehta CV (2020) reported (8%) whereas (18.9%) was reported by Chowdary et al.

In our study, the mean birth weight of babies was between 1500-2500gms. (66%) of first twin and (72%) of second twin had low birth weight(<2.5kg) in our study. In the study conducted by Patidar et al (2023),they observed low birth weight(<2.5kg) in first twin (79.6%) and (89%) in second twin. In the study conducted by Bengal et al low birth weight was seen in 82% twins. Similarly, Singh et al reported the incidence of low birth weight of (78.6%).[9]

Apgar score of <7 (1minute) was seen in (65.16%) of second twin which is higher compared to first twin (61.29%). About (67.74%) of second twin and (57.73%) of first twin were admitted to NICU. Similar results were observed in the study by Mehta CV (2020) that is, among twin1 Apgar score <1 was seen in first twin (40%)and in second twin (53%).In my study the need of NICU admission in first twin was (57.73%) and in second twin it was (67.74%). Similar results were seen in Patidar et al (2023) in which (57.2%) of first born twin and (58.4%) of second twin were shifted to NICU. Notably, the second twin required NICU care more frequently than the first, which aligns with existing literature indicating that the second-born twin is at a higher risk for adverse outcomes due to factors such as delivery method and intrauterine positioning. This increased NICU admission rate for the second twin can be attributed to complications during delivery, such as umbilical cord prolapse and delayed delivery intervals, which may compromise the second twin's condition.[10-15]

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In my study Perinatal mortality was (17.4%) which is higher than study by Mehta CV that is (11.4%) and Chowdhury and Sultana et al,[16] Higher perinatal mortality was observed in unbooked patients and patients referred from peripheral centres in comparison to booked patients .In my study the most common reason for neonatal death is prematurity and low birth weight .This demonstrates the importance of regular and effective antenatal care for better outcome in mother and baby. Although the majority of pregnancies resulted in live births, the notable incidence of neonatal deaths within the first week highlights the critical need for advanced neonatal care and immediate intervention strategies to mitigate early mortality risks.[12]

Fetal growth restriction (FGR) was a significant concern, affecting nearly a quarter of the pregnancies. This prevalence of FGR is consistent with previous research, which indicates that twin pregnancies are more prone to growth complications due to the shared intrauterine environment and limited resources available for each fetus.[13] FGR in twin pregnancies often results from placental insufficiency, where the placenta cannot meet the nutritional demands of both fetuses, leading to growth disparities. The occurrence of single intrauterine fetal demise, although relatively rare in this study, underscores the critical importance of continuous fetal monitoring in twin gestations. Monitoring can help detect early signs of fetal distress or complications, allowing timely interventions. The absence of stillbirths in this study is a positive outcome, suggesting that effective management and timely medical interventions were in place to address potential complications before they resulted in fetal loss.[14]

Overall, this study highlights the complexities and risks associated with twin pregnancies, emphasizing the need for specialized and vigilant prenatal and perinatal care. The high rates of NICU admissions, FGR, and maternal complications call for a multidisciplinary approach to manage these pregnancies effectively. Future research should focus on developing targeted interventions to reduce neonatal mortality and morbidity, improve maternal health outcomes, and enhance the overall management strategies for twin gestations.[15] The findings of this study contribute valuable insights into the challenges of twin pregnancies and underscore the importance of continuous improvement in clinical practices to support maternal and neonatal health in these high-risk pregnancies.[16]

CONCLUSION

The study highlights the significant challenges and complications associated with twin pregnancies. The increased incidence of twin pregnancies is attributed to increased advances in fertility treatment. The findings indicate a high incidence of preterm deliveries, NICU admissions, and maternal complications, underscoring the high-risk nature of twin gestations. The prevalence of conditions such as pregnancy-induced hypertension, anemia, and intrauterine growth restriction was notably higher in twin pregnancies compared to singleton pregnancies. Additionally, the study revealed that cesarean sections were the most common mode of delivery, reflecting the complexities and risks involved in managing twin births.

These results emphasize the critical need for vigilant prenatal, antenatal and perinatal care for twin pregnancies to improve maternal and neonatal outcomes. The study also underscores the importance of specialized care and the need for well-equipped neonatal intensive care units to handle the increased likelihood of neonatal complications. Overall, the findings call for enhanced focus on the management and support of twin pregnancies to reduce morbidity and mortality rates for both mothers and their babies.

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