TO STUDY THE CORRELATION BETWEEN SEVERE OLIGOHYDRAMNIOS WITH PERINATAL OUTCOME ALONG WITH HISTOPATHOLOGY OF PLACENTA

Peripydi Nirmala
Department of Obstetrics and Gynaecology[1]

Kuthadi Swarupa✉
Department of Obstetrics and Gynaecology[1]
kuthadiswarupa@gmail.com

Kavitha Kurakul
Department of Obstetrics and Gynaecology[1]

[1]*Modern Government Maternity Hospital/Osmania Medical college*
Koti, Hyderabad, Telangana, India, 500095

✉**Corresponding author**

Abstract

The aim: To study the correlation between severe oligohydramnios with perinatal outcome and the placenta's histopathology.

Materials and methods: comprised of 100 patients with oligohydramnios diagnosed after 28 weeks of gestation, admitted on an emergency basis, both booked/unbooked, who were willing to cooperate, were chosen. All patients with oligohydramnios (AFI < 5 %) were included in the study.

Results: 3 cases came with intra-uterine death. All three were totally unbooked cases. 2 preterm babies died neonatal intensive care unit after 4 days due to meconium aspiration syndrome. Thus the perinatal mortality was 5 %. 44 % of neonates required admission into the neonatal intensive care unit. In our study, it was found that neonatal mortality and morbidity increased significantly when oligohydramnios was associated with complications like IUGR and pregnancy-induced hypertension in mothers. All the cases associated with these histopathological changes had adverse perinatal outcomes. Hence estimation of the amount of liquor is important in the antenatal period because oligohydramnios gives insight into the associated maternal complications or fetal anomalies and has a significant bearing on the perinatal outcome. The placental examination will illuminate all the conditions affecting the perinatal outcome. Without associated complications, oligohydramnios does not have adverse perinatal outcomes.

Conclusions: Thus, in cases of oligohydramnios with no associated complications, expectant management can be tried for a better fetal outcome. Only oligohydramnios may be the first sign of placental insufficiency and an independent manifestation of the placental-related complications spectrum.

Keywords: oligohydramnios, complications, fetal outcome, amnionic fluid (AFI), APGAR Scores, Post maturity, meconium aspiration syndrome & perinatal mortality, morbidity. Intra Uterine Growth Restriction (IUGR) & Pregnancy Induced Hypertension (PIH), foetal heart rate.

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1. Introduction

Oligohydramnios has been defined as an ultrasonographically measured amnionic fluid (AFI) of <5 cm or as a single deepest vertical pocket of < 2 cm. Increasingly AFI < 5 cm is used in clinical practice to suggest oligohydramnios. The incidence in the literature varies from < 0.5 % to > 5 %, depending on the study population. Oligohydramnios poses a challenge in obstetric management, particularly when it is diagnosed before term. It is one of the major causes of antenatal fetal surveillance, and its estimation has become an integral part of antepartum fetal evaluation [1].

A decreased amnionic fluid volume is frequently one of the first clues to an underlying fetal abnormality or maternal disease state. Oligohydramnios is a recommended indication for placental examination by the College of American Pathologists (CAP). Oligohydramnios, often due to impaired placental function, has been associated with an increased risk of caesarian delivery for fetal distress, as well as with low APGAR Scores, Post maturity, meconium aspiration syn-

drome & perinatal mortality & morbidity. However, oligohydramnios can also be associated with other maternal & fetal conditions, such as congenital anomalies, Hypertension, Diabetes Mellitus, preterm PROM & IUGR. Each of these conditions can predispose the fetus to adverse outcomes. Thus it is not clearly known whether adverse perinatal outcomes merely reflect the sequelae of other conditions or if oligohydramnios contributes to the adverse outcomes [2, 3].

After the birth, examining the placenta for the presence of amnion nodosum on the placenta is highly correlated with oligohydramnios. The placental insufficiency changes may also correlate well with the severity of oligohydramnios associated with Intra Uterine Growth Restriction (IUGR) & Pregnancy Induced Hypertension (PIH). This study was done to correlate perinatal outcome and histopathological changes in cases of oligohydramnios. This study was accepted by the ethical committee of Osmania Medical College, Hyderabad.

Aims: To study the correlation between severe oligohydramnios with perinatal outcome along with histopathology of the placenta.

2. Materials and Methods

Material for the study comprised 100 patients with oligohydramnios from Jan 2017 to Jan 2018 being diagnosed after 28 weeks of gestation, admitted on an emergency basis, both booked/unbooked, who were willing to cooperate, were chosen. All patients with oligohydramnios (AFI < 5 %) were included except those with fetal congenital anomalies, with a maternal history of drug (such as Indomethacin, ACE Inhibitors) intake, rupture of membranes, and post-dated pregnancies are excluded.

A detailed analysis was made concerning the age, parity, booking status, and clinical history of the patient. Both preliminary and specific investigations, including ultrasonography with Bio Physical profile and Doppler flow studies, were done. Intrapartum monitoring was done by auscultating the fetal heart rate for 15 minutes and with a cardiotoco graphic machine. The mode of delivery was noted, and if LSCS done, indications for the same were noted. Baby Apgar was noted, and if there was any neonatal intensive care unit admission, the indication was noted according to the paediatrician and the admitted babies were followed to note the outcome.

The fetal/placental weight ratio was checked with a weighing machine. With measuring tape, placental measurements were taken. A gross examination of the placenta, umbilical cord and membranes was done. Later placenta was collected in a plastic container (the size of a large ice cream carton) with copious amounts of formalin (at least 10 times as much formalin as placental tissue).

Routine paraffin-embedded sections were stained with Hematoxylin and Eosin stains, and a microscopic study was done. Histopathological findings, thus obtained, were correlated with the severity of oligohydramnios and the fetal outcome. For analysis, patients were then divided into three groups based on the amnionic fluid index as 0–2, 2–4, and 4–5, and the association of these groups with the complications like pregnancy-induced hypertension and intrauterine growth restriction was also considered. The frequency of various possible prognostic factors within the groups was then determined, and possible associations were tested.

Bioethics: ethical committee of Osmania Medical College, Hyderabad number: M150714046 dated 28/7/2016.

Statistical methods used to analyse the results included – Mean = Standard error of the mean (SEM) values and χ^2 test. P-values of < 0.05 were considered significant.

3. Results

The total number of deliveries at MGMH, Petlaburj, and Hyderabad from Jan 2017 to Jan 2018 was 16814, of which 840 deliveries have oligohydramnios (5 %) (**Fig. 1**).

It is evident from **Table 1** that 66 cases were unbooked, and they received nil or minimal antenatal care. The mean maternal age in pregnancies complicated by oligohydramnios was 21. The highest incidence was found in the age group of 20–25 years, i.e., above 64 %. 62 cases were primigravida, 20 were second gravid and 18 were multigravida. The highest number of cases were between 34–36 weeks of gestation, i.e., 62 cases, while 23 cases were between 37–40 weeks. Most cases with amniotic fluid index < 4 received either nil or minimal antenatal care. (**Table 1**).

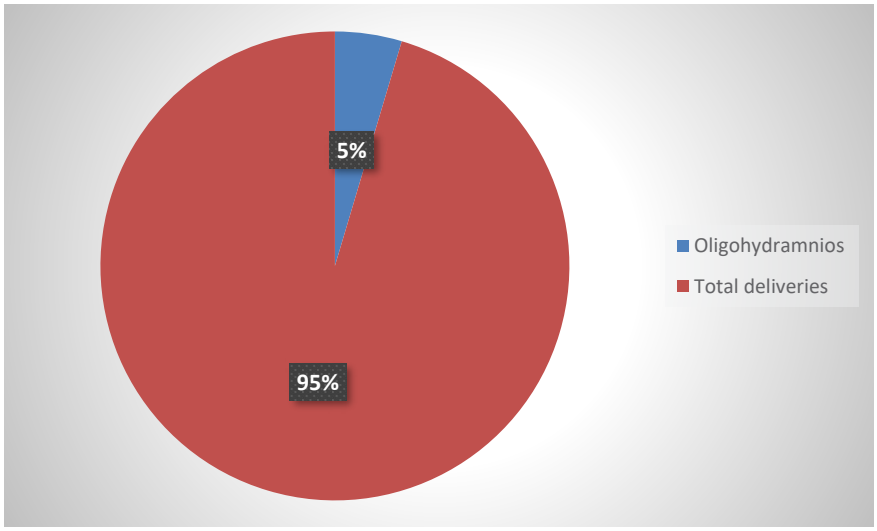

Fig. 1. Incidence of oligohydramnios

Table 1
Booking status in cases of oligohydramnios

Booking status	No of cases
Booked cases	44
Unbooked cases	66
Total	100
Age group	
< 20 yrs	3
20–25 yrs	64
26–30 yrs	33
31–35 yrs	0
Total	100
Gravidity	
Primi	62
Second	20
Multi	18
Weeks of gestation	
< 32 weeks	2
32–34 weeks	13
34–36 weeks	62
37–40 weeks	23
AFI	
0–2	12
2–4	41
4–5	47

It is evident from **Table 2** that in most patients with oligohydramnios, the cause was PIH, i.e., about 68 cases. The next common cause is IUGR, i.e., about 42 cases. This also shows that with increasing severity of oligohydramnios, there was a decreased incidence of associated complications, as is seen in the group AFI 0–2, all cases were associated with PIH and IUGR, and also it is statistically significant, the p-value being < 0.05.

Table 2
Maternal and fetal complications associated with oligohydramnios

AFI	Maternal and fetal complications associated with oligohydramnios				Oligohydramnios not associated with any complications (idiopathic)	
	PIH		IUGR			
	No.	%	No.	%	No.	%
0–2	12	100±10.0	12	100±10.0	–	–
2–4	31	75.61±7.5	31	58.5±5.8	9	21.9±2.1
4–5	25	53.1±5.3	25	12.7±1.2	20	42.5±4.2
Total	68	–	42	–	29	–

Note: P value is < 0.005

Management and outcome

Out of the 100 cases, 66 were unbooked and had no antenatal or only minimal antenatal care. 3 cases came with intrauterine death. 2 at 32 weeks and 1 at 37 weeks. On admission, all patients were fully evaluated. A detailed history was taken, and a thorough examination was done. Basic investigations were done.

Ultra sonogram and fetal biophysical profile, and Doppler velocimeter were also performed. Patients were advised bed rest in the left lateral position, and intravenous fluids were given and were advised to note the fetal movements (**Table 3**).

Table 3
Fetal biophysical profile score at admission

AFI	8/10		6/10		< 6/10	
	No.	%	No.	%	No.	%
0–2	3	25±2.5	4	33.3±3.3	5	41.6±4.1
2–4	27	65.8±6.5	13	31.7±3.1	1	2.4±0.24
4–5	38	80.85±8.0	8	17.02±1.7	1	2.1±0.21
Total	68	–	25	–	7	–

Note: P-value = 0.000004639

A biophysical profile score of 8/10 was noted in 68 cases, i.e., 68 %. Most cases were in the group AFI 4–5, about 25, i.e., 25 % showed a score of ≤ 6/10. This difference in biophysical score is statistically significant (**Table 4**).

Table 4
USG doppler velocimetry

AFI	Normal Doppler		Abnormal Doppler	
	No.	%	No.	%
0–2	3	25±2.5	9	75±7.5
2–4	31	75.6±7.5	10	24.3±2.4
4–5	40	85.1±8.5	7	17.07±1.7
Total	74	–	26	–

Note: P-value = 0.0001208

Doppler was considered abnormal when the umbilical artery pulsatility index is > 1, the resistance index is > 0.65, systolic/diastolic ratio is 3. Abnormal Doppler velocimetry was noted in 20 % of cases, most of them in the group AFI 0–2, accounting for 77.7 of cases. Hence it was noted that with increasing severity of oligohydramnios incidence of Doppler being abnormal is also increasing. This difference in the Doppler is statistically significant (**Table 5**).

Table 5
Mode of delivery

AFI	Abdominal Delivery		Vaginal Delivery			
			Spontaneous delivery		Forceps aided delivery	
	No.	%	No.	%	No.	%
0–2	10	83.3±8.3	2	16.6±1.6	–	–
2–4	35	85.3±8.5	6	14.6±1.4	–	–
4–5	27	57.4±5.7	20	47.5±4.7	3	12.7±1.2
Total	72	–	28	–	–	–

As the above table shows, 72 cases were delivered by caesarean section, and 10 cases in the group of AFI 0–2 were delivered by caesarean section.

For cases in the group, who came in active labour, vaginal delivery was allowed with careful fetal monitoring. This difference in the mode of delivery is statistically significant (**Table 6)**.

Table 6
Indication for the abdominal delivery

AFI	PIH		IUGR		FETAL Distress	
	No.	%	No.	%	No.	%
0–2	2	0.2±0.02	3	0.3±0.03	5	50±5
2–4	18	51.4±5.1	10	28.5±2.8	7	20±2
4–5	18	66.6±6.6	4	14.8±1.4	5	18.5±1.8
Total	40	55.55±5.5	17	23.6±2.3	16	22.2±2.2

Pregnancy-induced hypertension was the indication for about 40 cases out of 72 cases, i.e., about 55.5 %, while fetal distress was the common indication in the group AFI 0–2, accounting for 50 % in that group. The difference, thus found in various indications, is statistically significant (p-value 0.09545) (**Table 7**).

Table 7
Findings at the time of delivery

AFI	Liquor appearance				Gross changes of placenta			
	Clear		Meconium stained		Infarction		Amnion	
	No.	%	No.	%	No.	%	No.	%
0–2	3	25±2.5	9	75±7.5	12	100±10	9	75±7.5
2–4	21	51.2±5.1	20	48.7±4.8	35	85.3±8.5	18	43.9±4.3
4–5	41	87.2±8.7	6	12.7±1.2	26	55±5.5	6	10.6±1.0

Note: P-value = 0.4673

Meconium staining of liquor was seen in 35 % of cases. About 75 % of cases in the group AFI 0–2 showed meconium-stained liquor. This difference in the appearance of meconium in the liquor proved statistically significant.

In a gross examination of the placenta, about 33 % of cases showed amnion medium; while examining the fetal membranes, changes of significant infarction were found in about 73 % of cases. All cases of oligohydramnios associated with pre-eclampsia showed significant changes.

72.3 % of babies had good APGAR scores 5 minutes after birth 8–10, while in the group 0–2, 10 cases (83.3 %) had APGAR scores <7. This difference in the Apgar score is statistically significant (**Table 8**).

Table 8
Perinatal outcome in oligohydramnios

AFI	APGAR SCORE AT 5 MIN			
	8–10		< 7	
	No.	%	No.	%
0–2	2	66.6±6.6	10	83.3±8.3
2–4	32	78±7.8	9	21.9±2.1
4–5	34	72.3±7.2	13	27.6±2.7
Total	68	–	29	–

Note: P-value = 0.0002203

All cases in the group AFI 0–2 had low fetal placental weights ratios, while in the group AFI 2–4, 9 cases, i.e., about 21.9 % and in the group AFI 4–5, 21 cases, i.e., 44.6 % had normal fetoplacental weight ratio. This difference in the fetoplacental weight ratio is statistically significant (**Table 9**).

Table 9
Fetal/placental weights ratio

AFI	< 4		4–5		5–6	
	No.	%	No.	%	No.	%
0–2	6	50.0±5	6	50.0±5	–	–
2–4	6	14.63±1.4	26	63.41±6.3	9	21.9±2.1
4–5	–	–	36	55.31±5.5	21	44.6±4.4
Total	–	–	–	–	–	–

There was a high incidence of cases with low birth weight and intrauterine growth restriction, which needed admission to the neonatal intensive care unit.

All cases in the group AFI 0–2 required admission into the neonatal intensive care unit. This difference in NICU admissions is statistically significant (**Table 10**).

Table 10
Neonatal intensive care unit admissions

AFI	Duration of Stay in NICU						Cases not admitted	
	1–2 days		2–7 days		8+		No.	%
	No.	%	No.	%	No.	%		
0–2	2	16.66±1.6	8	66.6±6.6	–	–	–	–
2–4	18	43.90±4.3	2	4.87±0.4	–	–	21	51.21±5.1
4–5	12	25.33±2.5	3	6.38±0.6	–	–	34	72.34±7.2
Total	32	–	12	–	–	–	55	–

As is evident from the above table, there were 41 cases of IUGR and 76 cases of preterm delivery; this increased incidence of preterm delivery reflects the multiple maternal and fetal complications associated with oligohydramnios, thus causing many of the cases being terminated before term in view of fetal and maternal interests. This difference in the incidence of the complications mentioned above with regard to the severity of oligohydramnios is statistically not significant (**Table 11**).

Table 11
Perinatal Outcome

AFI	Intrauterine deaths + stillbirths		Preterm deliveries		Deaths < 7 days of birth		IUGR	
	No.	%	No.	%	No.	%	No.	%
0–2	2	16.6±1.6	12	15.78±1.5	1	8.3±0.8	12	29.26±2.9
2–4	1	2.4±0.2	40	52.63±5.2	1	2.4±0.2	23	56.09±5.6
4–5	–	–	24	31.57±3.1	–	–	6	14.63±1.4
Total	3	–	76	–	2	–	41	–

In the NICU, 16 cases had birth asphyxia, and 20 cases had respiratory distress. Among 5 cases of meconium aspiration, 2 babies died after 4 days. The difference in the incidence of various complications in the newborn is statistically significant (**Table 12)**.

Table 12
Complications in the newborn

AFI	Asphyxia		Meconium aspiration		Respiratory distress	
	No.	%	No.	%	No.	%
0–2	8	66.6±6.6	–	–	9	75±7.5
2–4	4	9.7±0.9	2	4.8±0.4	7	17.7±1.7
4–5	4	8.5±0.8	3	6.3±0.6	4	8.5±0.8
Total	16	–	5	–	20	–

The perinatal mortality rate in our study was 5 %; the difference between live births and perinatal deaths is statistically significant (**Table 13**).

Table 13
Perintal mortality rate (intra uterine deaths & still births & deaths < 7 days)

AFI	No. of deaths	%
0–2	3	25.1±2.5
2–4	2	4.8±0.4
4–5	–	–
Total	5	–

It is evident that with the increasing severity of oligohydramnios, there was an increase in the incidence of associated pathological changes (**Table 14**).

Table 14
Microscopic changes of placenta – oligohydramnios

AFI	Villous congestion/edema		Infarction		Syncytial knots		The basement membrane of thickening villi	
	No.	%	No.	%	No.	%	No.	%
0–2	11	91.66±9.1	12	100±10	7	58.33±5.8	12	100±10
2–4	34	82.92±8.2	35	85.36±8.5	26	63.41±6.3	30	73.17±7.3
4–5	21	44.68±4.4	26	55.31±5.5	16	34.04±3.4	28	59.57±5.9
Total	66	–	73	–	49	–	70	–

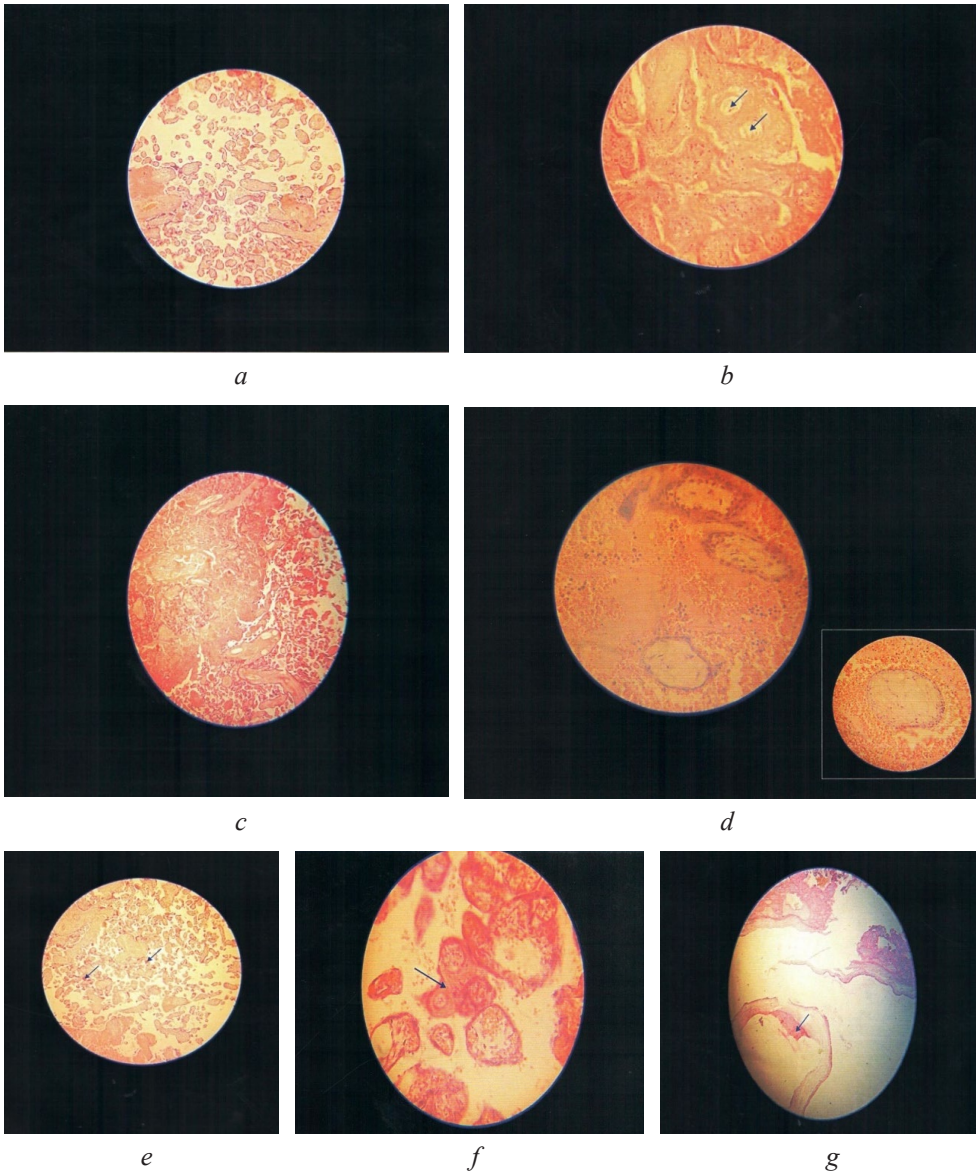

Fig. 1. Placental section: *a* – Histology of normal placenta; *b* – Placental infract: much of the villous trophoblast is necrotic in this order infract arrows lysed erythrocytes within the fetal capillaries; *c* – Placental fact: infract with aggregation of villi and obliteration intervillous space. Adjacent normal villi are seen in the right and the lower fields; *d* – Villous oedema: villous oedema forming open spaces surrounded by stromal cells; *e* – Syncytial knots; *f* – Basement thickening of capillary congestion in chorionic villi; *g* – Amnion Nodosum: Nodular deposit on the amniotic surface of the placenta

4. Discussion

There was an increased incidence of oligohydramnios complicating pregnancy in clinical practice because of the increased use of ultrasonography in the antenatal period. Oligohydramnios and its associated complications pose a serious risk to the fetus. The perinatal mortality rate varies from 4/1000 when AFI is < 1 cm, D. Hemalatha Devi et al. [4].

The incidence of oligohydramnios in our study was 4.8 %. It coincides with our study than the previous studies by Rabinovich A [5], which was 4.8 %. Oligohydramnios complicates 4.4 % of all pregnancies at term. The incidence of oligohydramnios is less than 1 % in preterm pregnancies [6].

They used AFI < 5 to categorise oligohydramnios. Most of the cases in our study, i.e. 66.6 %, had minimal or no antenatal care. Singh N, Pattnaik L [7], in his study, had an incidence of 12 %

gestational age at which it was diagnosed was between 34–36 weeks in most of the cases. In our study, about 62 % of cases presented at 34–36 weeks of gestational age.

In our study, the mean maternal age at which maximal incidence of oligohydramnios occurred was 21 years, the range being 20–25 years, and increased incidence of oligohydramnios was observed among primigravida, i.e. about 62 % of cases. This is partially in agreement with that of Jagatial et al. [8], who reported that the incidence of oligohydramnios was more in primipara (52 %), which is compatible with the study of Jandial et al. [8], which showed the incidence of 60 % in primigravida. There is a direct relationship between decreased amnionic fluid volume and the prevalence of intrauterine growth restriction (IUGR).

The incidence of IUGR is 61 %, Dalal N et al. [9]. The prevalence of IUGR in our study was 41 % which correlated study. There was an increased rate of cesarian deliveries because of increased incidence of associated maternal and fetal complications causing risks to both mother and the fetus, such as pre-eclampsia, IUGR fetal distress and abnormal Doppler velocimetry. Baron and Colleagues [9] reported a 7-fold increased incidence of cesarian section.

The incidence of the cesarian section in our study was about 72 %. The cesarean delivery (CD) rate was significantly higher in pregnancies with identified oligohydramnios compared to those without (84.4 versus 54.7 %; $p < 0.01$) in Hou L et al. study [6].

In our study, the perinatal mortality rate was 5 %. Figueroa L study women with oligohydramnios compared to those without had a higher risk for stillbirths (80.5 per 1000 births vs 14.9 per 1000 births, OR 5.16, 95 % CI 2.07, 12.85), neonatal deaths within 28 days (75.0 vs 16.7 per 1000 live births, OR 3.18, 95 % CI 1.18, 8.57).

The number of cases requiring admission to the neonatal intensive care unit was high in our study, 44 % when compared to Rabie N et al. study showed a Relative risk of 2.09, i.e. 2 folds increase.

Figueroa L and co-workers [10] observed that appropriately grown fetuses associated with oligohydramnios prior to 37 weeks gestational age had a significant 5-fold increased incidence of preterm delivery, which was 4-fold according to our study, which nearly coincided with the above study. In a different study, expectant management of isolated oligohydramnios at preterm was associated with similar neonatal outcomes compared to pregnancies with normal AFI. However, an increased risk of new-onset fetal growth restriction and lower birthweight was noted [11, 12].

Maternal complications include an increased incidence of pregnancy-induced hypertension, which was 22.1 %. According to Rabinovich A et al. [5] report, our study had an incidence of 68 % of PIH. In early onset – Oligohydramnios, otherwise normal infants may suffer consequences of early onset severely diminished amnionic fluid. Subjected to pressure from all sides, the fetus exhibits certain skeletomuscular deformities such as club foot.

In our study, there was only one case of severe Oligohydramnios whose newborn had a club foot, and it was an unbooked case. According to Benirschke and Kaufmann, in severe and prolonged cases of oligohydramnios, squamous debris is ground into the amnion by fetal movements. Keratinised squamous debris thus accumulates as lumps on the amnion surface, called amnion nodosum, which consists of compressed hair, squamous and fibrin from the nodules [13].

About 33 % of cases in our study showed this finding on gross examination. The majority of them are severe oligohydramnios cases. Most investigators agree that the frequency and extent of infarction are increased in proportion to the severity of the underlying maternal disease, especially pre-eclampsia.

In our study, 73 % of cases showed thick, centrally located and randomly distributed infarcts. All cases of oligohydramnios associated with pre-eclampsia showed changes in infarction which correlated well with its severity. Fox and Langley's study on placental pathology revealed that findings like infarcts and basement membrane thickening of villi are increased in proportion to the severity of pre-eclamptic toxaemia and IUGR.

The basement membrane thickening of villi was found in about 70 % of cases of oligohydramnios associated with complications. According to Went Worth [14], the incidence of infarction increases in cases with pre-eclampsia (34 to 65 %). In our study, changes like infarction and basement membrane thickening of villi in microscopy correlated well in proportion to the severity of

pre-eclampsia associated with oligohydramnios. Jaiman S et al. [14] found villous oedema in consecutive unselected singleton placentas in associations with severe prematurity and low APGAR scores.

According to Olimjanovna [15], clumps of syncytial nuclei are found projecting into the intervillous space, beginning after 32 weeks. These projections are called syncytial knots and likely represent apoptosis. 49 % of cases in our study showed syncytial knots. Most of these cases are associated with complications such as pre-eclampsia or IUGR.

In the study of histopathological changes of the placenta, it was noted that changes like villous oedema and congestion, infarctions, basement membrane thickening of Villi and Syncytial knots, correlated well in proportion to the severity of oligohydramnios, particularly with the complications associated with oligohydramnios such as pregnancy-induced hypertension in mother and IUGR. Leytes S et al. [12] study shows Perinatal outcome was more severe in cases of oligohydramnios complicated by PIH than in isolated oligohydramnios. So, a woman who is at term with isolated oligohydramnios with reassuring fetal surveillance and absence of maternal morbidity and evidence of IUGR is not associated with adverse perinatal outcomes, which is in coincidence with other studies [16, 17].

The results of the present study are comparable to the study conducted by Arora D et al. [18], showing there is a correlation between poor perinatal outcome & abnormal Histopathological changes in the placenta. The abnormal histopathological changes were primary infarction, hemorrhagic endovasulitis and increased syncytial knots. In a study conducted by C. Maureen Sander et al. [19], the correlation between fetal outcome and histopathological changes in the placenta.

The result of the present study is comparable to Melamed N et al.'s [20] study, which shows perinatal outcome was more severe in cases of oligohydramnios complicated by PIH than in isolated oligohydramnios. So, a woman who is at term with isolated oligohydramnios with reassuring fetal surveillance and absence of maternal morbidity and evidence of IUGR is not associated with adverse perinatal outcomes.

Limitations of the study. Our study is limited by its retrospective design, although data did originate from a single centre and were available for review. Importantly, information was available for actual birthweight; hence small gestational age incidence was evaluated and not intrauterine growth retardation. Hence small for gestational age neonates may include those constitutionally small. In a prospective setting, the two would be better differentiated, and neonatal gender, unavailable for the current analysis, would be adjusted for.

Prospects for further research. To strengthen the statistical significance, we had a preliminary power analysis and a relatively large sample size that was mandatory to support our theory. Still, the rate of pre-eclampsia in our cohort was relatively low. Therefore, our study was unable to demonstrate an association between isolated oligohydramnios in first pregnancy and pre-eclampsia in subsequent delivery if one exists. A distinctive feature of our research is the ability to evaluate the predominant effect of isolated oligohydramnios on future delivery, as we selected a cohort of women without any other obstetric placental-related complication in their previous delivery. Our findings may be useful in the clinical setting, indicating the importance of reviewing patients' obstetrical history. In cases of isolated oligohydramnios in a previous delivery, a clinician should consider the closer observation of fetal growth in a subsequent pregnancy to diagnose FGR in time.

5. Conclusions

1. Assessment of amnionic fluid has become an integral component of antepartum assessment of fetal well-being. This is based on the rationale that decreased uteroplacental perfusion may lead to decreased fetal urine production and, ultimately, to oligohydramnios. A decreased amnionic fluid volume is frequently one of the first clues to an underlying fetal abnormality or a maternal disease state. Histopathological changes of placenta reflecting the compromise in uteroplacental perfusion. Correlates well with perinatal outcome.

2. Perinatal mortality was 5 %. 44 % of neonates required admission into the neonatal intensive care unit. In our study, it was found that neonatal mortality and morbidity increased significantly when oligohydramnios were associated with complications like IUGR and pregnancy-induced hypertension in mothers.

3. All the cases associated with these histopathological changes had adverse perinatal outcomes. Hence estimation of the amount of liquor is important in the antenatal period because oligohydramnios gives insight into the associated maternal complications or fetal anomalies and has a significant bearing on the perinatal outcome. The placental examination will throw light on all the conditions affecting the perinatal outcome. In the absence of associated complications, oligohydramnios does not have adverse perinatal outcomes. Thus in cases of oligohydramnios with no associated complications, expectant management can be tried for a better fetal outcome.

Conflict of interest

The authors declare that there is no conflict of interest in relation to this paper, as well as the published research results, including the financial aspects of conducting the research, obtaining and using its results, as well as any non-financial personal relationships.

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Data availability

Data will be made available on reasonable request.

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