"STUDY OF ERYTHROCYTE SEDIMENTATION RATE CHANGES IN OBSTETRICS AND GYNECOLOGY"

by

S. R. DHALL, M.S., P.C.M.S.,

Professor of Obstetrics & Gynecology,
Medical College, Amritsar,

and

O. P. TANEJA, M.S.,

Senior Lecturer in Surgery,
Christian Medical College, Ludhiana
(Formerly Clinical Research Assistant,
Department of Obstetrics & Gynecology,
Medical College, Amritsar)

Introduction

The sedimentation test may be defined as a non-specific reaction caused clinically by inflammation or tissue destruction; and manifested clinically by increased velocity of sedimentation of red cells in citrated blood. The phenomenon of sedimentation was known to the earlier phlebotomists by whom the hastened settling of inflammatory blood was considered as a sign of clinical importance. References to this are present in the works of Hippocrates and Galen as 'Crusta Phlogistica' as mentioned by John Hunter in 1797 (Jacobs, 1932). In many medical works of the eighteenth century and afterwards, other observations were made on the 'Crusta Phlogistica' or the 'Buffy Coat', but the subject was studied in a desultory fashion only; and as the humoral doctrines were relegated to the past, the question was shelved. In 1918, attention was again focussed on the subject by Fahraeus who pointed out that the sedimentation rate was raised during pregnancy.

About 1920, numerous reports appeared on the subject of sedimentation in many diseases on the Continent where Linzenmeier and Westergren inspired a large series of investigations. Later, there was a spate of articles from the United States about the significance of this test in obstetrics and gynaecology (1 to 5, 7 to 10, 12 to 15, 18, 20-24). Sedimentation test has been used as an aid in the diagnosis of many ailments from bone diseases to psychosis, and numerous papers have been published, which, while raising many points of interest, perhaps, tended to obscure the real significance of this reaction.

Many have been the speculations and experiments concerning the various phases of this phenomenon,

and the various factors concerned with its occurrence have been discussed in detail by Fahraeus (1929) and others. A true assessment of the value of erythrocyte sedimentation test is rendered difficult by the lack of standardization in the methods employed. A modification of either of the two well-known methods of Westergren or Linzenmeier is usually employed.

The present study was undertaken with a view to confirm the impressions and conclusions arrived at by previous workers in the other countries, as references on this subject are few in the Indian literature. Also, this test was used as a check on the presence or absence of any associated systemic disease in our obstetrical and gynecological cases, who were otherwise normal.

Material

This study was carried out on 329 patients drawn from the outpatients and inpatients departments of the Government Hospital for Women, Medical College, Amritsar, during the years 1955-56. A total of 634 sedimentation tests were performed on these patients. The main bulk of the case material was formed by healthy pregnant women at different periods of gestation. The distribution of our cases is given in Table I.

Technique

Westergren technique as modified by Napier and Dasgupta (1941) was employed for the estimation of the sedimentation rate in this series. In this, 0.4 ml. of 3.8 per cent sodium citrate solution was drawn in a record syringe into which the blood from the antecubital vein was withdrawn upto 2.0 ml. The test was performed in the Westergren tubes and readings were taken at the end of one hour. The following precautions were observed during the test to minimize the sources of error :—

1. All the tests were performed on fasting patients.
2. The apparatus used was carefully cleaned and dried.
3. The dilution with sodium citrate was kept accurate.
4. The tubes were placed in the absolutely vertical position.
5. The specimen of blood was rejected in the presence of any trace of coagulation or hemolysis.
6. The tests were carried out within half an hour of collecting the sample of blood, after thoroughly shaking the bottle.
7. All the estimations were done by one of us (OPT) personally to eliminate the human source of error.

TABLE I

Distribution of Cases

Type	No. of cases	No. of tests performed
A. Obstetrical cases		
Normal pregnancy	194	339
Pregnancy complicated by disease	58	132
B. Gynecological cases	77	163
Total	329	634

8. The investigations were performed under the ordinary room temperature and atmospheric pressure.

Normal Values. Although most text-books describe an E.S.R. value of *4-7 mm./1 hour* as normal for females after Westergren (1921), Napier and Dasgupta (1941) adopted a range of 5 to 40 mm. as normal for healthy Indian females. However, for purposes of this study, the standards obtained by Khanna and Sachdev (1946) for normal Punjabi women were adopted, that is, an average E.S.R. of 14.4 mm, range ±3.74 mm.

Other Investigations. During the course of this study the sedimentation tests were done by both the Westergren and Wintrobe techniques (Wintrobe and Landsberg, 1935) in a large number of the cases. As the readings obtained by the former method were more constant and reliable, they were selected for analysis.

In addition, the haemoglobin level and the total and differential leucocyte count were determined in all the cases. In gynecological patients, the total and differential leucocyte counts were repeated at fortnightly intervals and the results were recorded on a special proforma.

Analysis of Data

During Normal Pregnancy. The 339 tests performed on 194 pregnant women at different stages of pregnancy were analyzed. These women were free from infectious diseases and other complications of pregnancy at the time of examination. Table II shows the average E.S.R. with the range of values in relation to the period of gestation. From this it is clear that even during the second month of pregnancy, the sedimentation rate is higher than normal (22.0 mm./1 hr.) and this was seen in 4 cases out of the 5 patients examined. However, the values do not change appreciably during the next two months. At the fifth month of pregnancy, the sedimentation rate starts rising and reaches its peak at the seventh month, when there is a slight fall afterwards. The sedimentation rate remains steady during the last three months of gestation. On closer analysis, these changes are not found in all the cases. Even during

TABLE II

Level of E.S.R. at Various Stages of Normal Pregnancy

Period of gestation in weeks	No. of cases	No. of tests	Average Range of E.S.R. in mm./1 hr.	
Between 4 to 8 weeks	5	5	22.0	6— 33.0
„ 9 to 12 „	10	10	21.5	9— 41.0
„ 13 to 16 „	8	9	21.9	10— 30.0
„ 17 to 20 „	10	11	27.2	14— 40.0
„ 21 to 24 „	7	7	39.6	16— 80.0
„ 25 to 28 „	15	15	53.6	26— 97.0
„ 29 to 32 „	23	26	49.9	6—112.0
„ 33 to 36 „	51	56	48.3	6.5— 95.0
„ 37 to 40 „	93	100	49.4	6—138.0

the last trimester, the E.S.R. was within the limits of normal in about 8 per cent of the patients — 2 cases out of 23 at 32 weeks; 4 out of 51 at 36 weeks; and 8 cases out of 100 at 40 weeks.

first to fourth gravida. The results do not bear out any relation between the number of pregnancies and the sedimentation rates.

During Pregnancy Complicated By Other Disorders. 58 cases were

TABLE III

E.S.R. according to the Age of the Patients in 92 Patients at Fullterm

Age group	No. of cases	Average Range of E.S.R. in mm./1 hr.	
Between 16 to 20 years	25	51.16	9— 95.0
„ 21 to 25 „	30	50.47	11—138.0
„ 26 to 30 „	23	50.0	7.5— 95.0
„ 31 to 35 „	10	59.65	6.5—111.0
„ 36 to 40 „	4	53.5	26— 80.0

Table III presents the level of sedimentation in relation to the age in 92 cases at fullterm. While the average values are almost the same upto the age of 30 years, the highest readings were obtained between the ages of 31 to 35 years and was slightly lower afterwards.

The sedimentation rate during the last month was studied according to the number of the pregnancies of these in 92 patients (Table IV). A large majority of the patients were

studied with a view to observe the effect of other conditions on the sedimentation rate during pregnancy (Table V). There were 14 cases of anemia associated with pregnancy on whom 24 tests were performed. The average sedimentation rate was 69.9 mm., range 5.0-178.0 mm./1 hr. The sedimentation rate varied from 31.0 to 158.0 mm. average 62.1 mm./1 hr. in ten cases of antepartum hemorrhage from placenta previa. In 7 patients

TABLE IV

Relationship between E.S.R. and the Number of Pregnancy in 92 Fullterm Patients

No. of pregnancy	No. of cases	Average Range of E.S.R. in mm./1 hr.	
Primigravida	22	51.0	31—118.0
Second gravida	7	60.4	11— 85.0
Third gravida	19	48.0	9—138.0
Fourth „	12	55.5	12— 95.0
Fifth „	10	48.7	7.5—111.0
Sixth „	8	51.5	21— 80.0
Seventh „	8	40.1	6.5— 68.0
Eight „	1	15.0	15.0
Ninth „	2	59.0	38— 80.0
Tenth „	1	78.0	78.0
Eleventh „	2	33.0	26— 40.0

suffering from diarrhoea or dysentery, the average E.S.R. was 73.4 mm., (34.0-112.0 mm./1 hr.). Six patients with heart disease complicating pregnancy had an E.S.R. of 67.2 mm., with a range of 11.0-123.0 mm./1 hr. It is of importance to record that all these diseases were associated with secondary anemia.

There were 4 patients suffering from pre-eclamptic toxemia and eclampsia respectively with an average E.S.R. of 46.0 and 66.8 mm./1 hr. In three patients with severe renal disease, the sedimentation rate was 79.7 mm., range 10.0-136.0 mm./1 hr. In six patients of hydramnios, the E.S.R. varied from 15.0-84.5 mm., average 57.2 mm./1 hr.

During Puerperium. Erythrocyte sedimentation rate changes during puerperium were studied on 86 patients at 136 occasions. The level during puerperium has been compared with the antepartum level (Table VI). The level is usually elevated on the second, fourth and seventh days of the puerperium and tends to decline after the twelfth day. These changes are not uni-

TABLE V

E.S.R. Changes in Pregnancy complicated by Diseases

Disease	No. of cases	No. of tests	Average E.S.R. in mm./1 hr.	Range of E.S.R. in mm./1 hr.
Anemia	14	24	69.9	5.0—178.0
Antepartum hemorrhage with anemia and other disorders ..	10	14	62.1	31—158.0
Diarrhoea and dysentery ..	7	9	73.4	34—112.0
Heart disease and anemia ..	6	10	67.2	11—123.0
Pre-eclamptic toxemia ..	4	6	46.0	30— 67.0
Eclampsia	4	4	66.8	40— 86.0
Nephritis	3	3	79.7	10—136.0
Hydramnios	6	7	57.2	15— 84.5

TABLE VI

E.S.R. Changes in 86 Patients during Puerperium, compared with E.S.R. before Delivery

Postpartum days	No. of tests	E.S.R. average	Before delivery range	E.S.R. average	Postpartum range	Trend of changes		
						Rise	Fall	No change
Second day	4	42.0	37— 46.0	47.0	35— 65.0	3 (75%)	1 (25%)	0
Fourth day	78	51.6	5—143.0	60.9	5.0—120.0	55 (70.5%)	20 (25.6%)	3 (3.9%)
Seventh day	49	54.2	5.0—143.0	60.1	5.0—126.0	28 (57.2%)	20 (40.9%)	1 (2%)
Twelfth day	5	60.0	40— 90.0	36.6	2— 65.0	1 (20%)	4 (80%)	0

formly present. As a matter of fact, the sedimentation rate had fallen below the antepartum level in 1 case on the second day (25 per cent); in 20 patients on the fourth day (25.6 per cent) and was steady in 3. On the seventh day, there was a fall in 20 cases (40.9 per cent) and it was the same in 2 patients.

Gynecological Diseases. 77 patients suffering from neoplastic and inflammatory conditions of the female generative organs and the pelvic adnexae were examined 163 times. Table VII presents the changes in the erythrocyte sedimentation rate in these gynecological conditions before any treatment. The changes were repeatedly studied after treatment.

Ovarian Tumors. In 15 patients of benign ovarian neoplasms, the average E.S.R. was 45.3 mm., range 2.5 to 146.0 mm./1 hr. The E.S.R. in nine cases of malignant ovarian tumors was 50.4 mm., range 10.0-96.0 mm./1 hr.

Tubo-ovarian Mass. The sedimentation rate was very high — average 106.2 mm, range 33.0-156.0 mm./1 hr. in ten cases of acute tubo-ovarian inflammatory masses. In six cases of subacute inflammations, the level varied from 29.0-64.0 mm., average 46.1 mm./1 hr. In eight patients of chronic tubo-ovarian inflammations, the E.S.R. was 17.8 mm., range 4.0-44.0 mm./1 hr. In a case of tuberculous hydrosalpinx, the sedimentation rate was 17.0 mm. only.

Pelvic Peritonitis. The average E.S.R. in ten cases of pelvic peritonitis and cellulitis was 100.4 mm., range 63.0-143.0 mm./1 hr.

Puerperal Sepsis. In 5 cases of puerperal sepsis the average sedimentation rate was 102.4 mm.,

TABLE VII

E.S.R. Changes in 77 Cases with different Gynecological Conditions before Treatment

Disease	No. of cases	No. of tests	Average E.S.R. in mm./1 hr.	Range of E.S.R. in mm./1 hr.
Ovarian neoplasms				
Benign-cystic	15	27	45.3	2.5-146.0
Malignant	9	12	50.4	10-96.0
Tubo-ovarian inflammations				
Acute	12	38	106.2	33-156.0
Subacute	6	13	46.1	29-64.0
Chronic	8	13	17.8	4-44.0
Tuberculous salpingitis ..	1	1	17.0	17.0
Pelvic peritonitis & abscess ..	10	23	100.4	63-143.0
Puerperal sepsis	5	6	102.4	55-176.0
Bilateral thrombophlebitis ..	2	7	126.3	114-139.0
Ectopic pregnancy (ruptured) ..	2	12	109.5	95-124.0
Pyometra	1	4	37.0	—
Tuberculous endometritis ..	1	2	72.0	—
Chronic cervicitis	2	2	14.0	11-17.0
Retroverted uterus	1	1	81.0	—
Gravid retroverted uterus ..	1	1	66.0	—
Hydatidiform mole	1	1	70.0	—

range 55.0-176.0 mm./1 hr.

Miscellaneous. The E.S.R. in bilateral thrombophlebitis, ruptured ampullary pregnancy and some other gynecological conditions are also presented in Table VII.

Table VIII shows the relationship between the E.S.R., total leucocyte count and body temperature in ten cases of acute or subacute tubo-ovarian inflammatory masses and their changes after treatment. In 8 cases the sedimentation rate was still above the average normal when the total leucocyte count and the temperature had returned to the normal and the patients showed clinical signs of improvement. The E.S.R. was accelerated in 2 patients after pelvic diathermy treatment, In the operated cases there was always a rise after the operation with a slow decline on the 10-15th day postoperative.

Discussion

During Normal Pregnancy. The literature abounds with references pointing to an elevated sedimentation rate in pregnancy. Fahraeus's figures based on 100 pregnant women show an increased rate during the second month of pregnancy rising progressively to a high rate at term. Mathieu et al. (1931) in their study on 350 normal pregnant women observed a definite increase from the third month of gestation onwards and similar results were also obtained by Griffin (1934) in 100 prepartum cases. Obermer (1948) in his observations on 88 normal patients observed a rise as early as the sixth to eighth week of pregnancy and a regular rise after the eighth week and the highest level was recorded at 40 weeks. Taylor and Roberts (1950) observed a rise in all the cases at the 28th week only. On the other hand, Bland and others (1934) found an increased rate after the third month in 540 cases and the highest level was recorded in 75 per cent of these at the sixth month. Vogt (1941) noticed an increase after the fifth month only.

Sinha (1945) during the course of her studies on 75 Indian females did not notice any change till 18 weeks. She observed a change from the fifth month onwards and the maximum readings were recorded in the last month. In this series (Table II), although the number of tests performed in early pregnancy is small, there was a definite rise of E.S.R. during the second, third and fourth months of pregnancy. There was a progressive rise from the 16 weeks. The highest average of 53.6 mm. was recorded at 28 weeks. There was a slight fall at 32 weeks and it remained steady during the last three months. The average readings in this series were always lower than those mentioned by Sinha (1945) from Patna. This difference can be explained by the fact that the latter series included a small number of patients only. However, we are inclined to agree with Fahraeus and Obermer that the E.S.R. is elevated after the second month of pregnancy, but there is a progressive increase from the fourth month of pregnancy only, as suggested by Linzenmeier, Taylor and Roberts, (1950) and Vogt (1941).

It is still difficult to explain the reason for this increased sedimen-

TABLE VIII

Comparative Study of Changes in E.S.R., Total Leucocyte Count, and Body Temperature in 10 Cases of Acute Tubo-ovarian Inflammatory Mass

Case no.	Disease	No. of tests	Before treatment			After treatment			Remarks
			E.S.R.	W.B.C.	Temperature	E.S.R.	W.B.C.	Temperature	
1.	Acute T.O. mass	7	110.0	8,500/c.mm.	100.0 F.	75.0	6,000/c.mm.	98.4 F.	Rise after inductothermy
2.	Acute bilateral T.O. masses	7	120.0	12,050/ „	101.0 F.	66.0	10,050/ „	98.4 F.	
3.	Acute T.O. abscess	6	156.5	13,800/ „	102.0 F.	40.0	7,000/ „	98.0 F.	
4.	Acute T.O. mass	4	94.0	23,050/ „	101.0 F.	74.0	10,000/ „	98.0 F.	
5.	Acute gonococcal T.O. mass	3	126.0	11,000/ „	100.4 F.	75.0	9,000/ „	98.2 F.	
6.	Acute T.O. mass	3	115.0	7,150/ „	104.0 F.	89.0	7,000/ „	98.4 F.	Operated, uneventful recovery
7.	Acute bilateral T.O. masses	2	92.0	9,500/ „	100.0 F.	68.0	7,600/ „	98.4 F.	
8.	Subacute T.O. mass	3	59.0	14,200/ „	100.0 F.	27.0	10,850/ „	98.0 F.	
9.	Subacute T.O. mass	4	64.0	8,500/ „	101.0 F.	17.0	5,200/ „	98.0 F.	
10.	Subacute bilateral T.O. masses	3	40.0	10,750/ „	99.5 F.	17.0	8,500/ „	98.4 F.	

tation rate of erythrocytes in uncomplicated normal pregnancy. In spite of many speculations as to its causation, one can only surmise that this reaction is a manifestation of the normal circulatory and hematological changes associated with pregnancy, and find their full expression only after a generalized biological reaction to the pregnancy takes place in the body, that is, after the fourth month. That this non-specific reaction fails to manifest itself after pregnancy in some cases is worth recording. This lack of response was observed in about 8 per cent of the patients during the last trimester. Mathieu et al. (1931) found this phenomenon in 2.7 per cent of their patients. The exact cause for this remains unknown.

Relation to Age. Sinha (1945) observed the highest E.S.R. in patients between the age of 20-30 years, the optimum child-bearing period of life. Our analysis showed the higher readings between the ages of 31 to 35 and 36-40 years. (Table III). The average E.S.R. in the younger age groups was almost the same. As more than 80 per cent of the patients belong to the age groups of 16 to 30 years, it is likely that age has no relation to the level of sedimentation during pregnancy.

Relation to the Number of Pregnancy. The results in Table IV do not bring out any definite effect of the number of pregnancy on the sedimentation rate of the red-cells. The average readings do not show any difference from the first to the sixth pregnancy, though the highest level was seen in the second gravida. Sinha recorded the highest levels in primi and eighth gravida and a decline upto the fourth pregnancy. Our results do not support her conclusions.

Relation to Other Diseases Complicating Pregnancy. A study of Table V shows a high average E.S.R. in pregnancy complicated by anemia and other conditions leading to secondary anemia, like antepartum hemorrhage and heart diseases. The average E.S.R. of 69.9 mm. in severe anemia as compared to an average of 49.4 mm. in normal pregnant females tend to prove that anemia has an acclerating effect on the sedimentation of erythrocytes in pregnant as well as non-pregnant women. This is in line with the conclusions arrived at by Bland and others and Griffin. In diarrhoea and dysentery, the high rate of 73.4 mm. is the result of infection, anemia and dehydration.

Sinha, Canter (1934) and Vogt (1941) did not find any change in the sedimentation rate in toxemias of pregnancy before or after delivery. Griffin, on the other hand, noticed a marked increase in his toxemic patients. Analysis of our data does not show any appreciable difference in subjects of pre-eclampsia. But there is a definite elevation in patients of eclampsia. This can possibly be explained on the basis of the fact that changes in toxemias of pregnancy depend upon the degree of disturbance produced in the body; a normal rate being associated with the relatively mild pre-eclamptic toxemia and a higher rate with eclampsia which creates a widespread biological upset in the subject.

The E.S.R. is also influenced by a number of other medical conditions

associated with pregnancy like heart disease, renal diseases and infections (Table V). In other words, an unexplainable rise in the sedimentation rate during pregnancy should lead to a search for some other disease in the obstetrical patient.

During Puerperium. Bland and others studied the sedimentation rate changes on 540 patients before and after delivery. They noted a rise above the antepartum levels for ten days afterwards and the E.S.R. returned to normal by the end of four weeks. Similar findings were also observed by Griffin, and Taylor and Roberts. Mathieu et al. observed an increased E.S.R. during the first week of the puerperium and a return to normal by the fourth week. Vogt demonstrated a sharp increase in the sedimentation rate on the second day and this change persisted during the first week when the decline started and it reached normal levels by six weeks.

Table VI presents a comparative study of the levels of E.S.R. before delivery and on the second, fourth, seventh and twelfth days of the puerperium in the same patients. There was a sharp increase in the sedimentation rate on the second day and this rise persisted till the fourth day in some patients. However, in 25.6 per cent of the cases it had fallen to a lower level compared to the level before delivery on the fourth day. On the seventh day, the average readings, although above the antepartum level, were slightly below the rate on the fourth day. Also the E.S.R. had fallen below the antepartum level in 40.9 per cent of the patients examined. This gradual return towards the normal is clearly evident from the few tests performed on the twelfth day of the puerperium. A prolonged follow-up of these cases was not possible as the patients usually left the hospital by that time and could not be present for further check-ups. Canter (1934) obtained results similar to ours. To sum up, we can say that the sedimentation rate rises above the antepartum level in the immediate postpartum period up to the fourth day, and while this acclerated rate may persist upto the seventh day in some cases, the decline towards the normal has already started.

Gynecological Diseases

Ovarian Neoplasms. Contrary to the experience of other workers like Benischek and Douglas (1927), Li (1943), Mathieu et al. (1931), Stimson and Jones (1929), Jacob (1932) and Jackson (1930), the sedimentation rate was raised in 10 cases of benign ovarian neoplasms and it was within the normal limits in 5 cases only. It is not possible to explain this discrepancy between our results and of others, who stated that benign ovarian tumors do not affect the E.S.R.

In 9 patients with malignant ovarian tumors, the E.S.R. was normal in one and raised in the rest. The average reading was higher than that for benign tumors. However, even this raised sedimentation had no clinical or diagnostic significance in this condition (Li).

Pelvic Inflammations. The sedimentation test derives its greatest importance in inflammatory conditions of the female pelvic organs. This test has been used in the differential diagnosis of acute appendi-

citis from pelvic inflammations by Lintgen and Fry in 1938 and to exclude ectopic pregnancy (Polak, 1927; Jacobs). However, this test was soon given up because of its innumerable fallacies (Mathieu et al.). Later, several American investigators tried to employ sedimentation test as a criterion for the assestment of prognosis and results of treatment in pelvic inflammations (Ballard and Calkins, 1931; Black, 1927; Benischek and Douglas; Jackson; and others). These workers expressed divergent views on the subjects. The data presented in Table VII show the highest readings in cases of acute tubo-ovarian mass, pelvic peritonitis or abscess, and puerperal sepsis. The increased sedimentation rate was accompanied by raised body temperature and high total and differential leucocyte counts. Although this test has been of no diagnostic significance in this group of disorders, it is of help to the gynecologist in the assesment of the extent and severity of inflammation in the patient with acute pelvic inflammation. On repeating these tests in this condition, we found the E.S.R. to be still high while the patient showed clinical signs of improvement and the leucocyte level had returned to normal. Some of these patients had an exacerbation of the signs and symptoms after pelvic diathermy or a stormy postoperative period (Table VIII). These conclusions were also derived by Black and others. To sum up, one can say that in pelvic inflammations the more acute and widespread the inflammation, the greater will be the sedimentation rate and that persistent high readings in the absence of high leucocyte count and elevated body temperature denote persistent active infection and that repeated estimations are the best guide to the time for surgery and the assessment of prognosis.

Ectopic Pregnancy. The unusually high E.S.R. in these two patients is the result of rupture and irritation of the pelvic peritoneum.

Miscellaneous. The sedimentation is also altered in many other pelvic conditions like pyometra, hydatidiform mole, tuberculous endometritis, and retroverted uterus apart from the inflammations.

Summary

A study of erythrocyte sedimentation rate changes is presented on 329 patients on 634 occasions using the Westergren technique.

1. A total of 334 tests was performed on 194 normal pregnant females at different stages of pregnancy. The sedimentation rate is raised during the first four months of pregnancy and shows a progressive increase upto the seventh month and remains steady afterwards.

2. The age of the patients and the number of pregnancy had no relation to the level of E.S.R.

3. In 58 pregnant patients suffering from some other diseases, the E.S.R. was increased in the presence of anemia, heart disease, renal conditions — nephritis, dysentery and diarrhoea. There were no significant changes in the presence of toxemias of pregnancy.

4. During the puerperium the sedimentation rate rises till the seventh day and tends to decline afterwards.

5. 163 tests undertaken on 77 cases of different gynecological disorders revealed the highest levels in the presence of pelvic inflammations.

6. This investigation has its greatest importance in the assesment of extent, severity and prognosis in pelvic inflammations. It is a reliable guide to the line of treatment to be adopted and its results.

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