

Pre-operative hemoglobin level: Correlation with hemoperitoneum in ectopic pregnancy

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Abstract

Aim: To find out the incidence and correlation of preoperative hemoglobin level (Hb %) with hemoperitoneum in cases of ectopic pregnancy (EP).

Methods: This was a prospective study carried out in Tribhuvan University Teaching Hospital (TUTH), Nepal during the period of 5 years; 15 April 2002-14 April 2007 (Baisakh 2059 – Chaitra 2063). All the cases of hemoperitoneum from rupture of EP confirmed at laparotomy were analyzed. Unruptured ectopic EP undergoing medical management or ruptured organized EP forming tubo-ovarian mass and ruptured rudimentary horn pregnancy without hemoperitoneum were all excluded. Data were collected from patient's interview, reviewing the operation record and record file.

Result: Of the total 167 EP constituting 0.963 % of all deliveries, managed during the five years period, 150 (90%) cases with hemoperitoneum were analyzed. Further excluding five cases not mentioning the amount of hemoperitoneum 145 [$< 1500\text{ml}$ (98) or $> 1500\text{ml} \rightarrow 3000\text{ml}$ (47)] was categorized to have different degrees of anaemia was ascertained in 90 (62.1%): Severe (13), moderate (55) and mild (22). Results depicted a negative (inverse) correlation between pre operative Hb level and hemoperitoneum.

Conclusion: In conclusion there is negative (inverse) correlation between pre-operative Hb percentage and hemoperitoneum which is statistically significant.

Keywords: Ruptured ectopic, hemoperitoneum, hemoglobin level

Introduction

The text book definition of ectopic pregnancy referring to implantation of fertilized ovum outside the uterine cavity is not strictly true because implantation in the cervical canal, cornua and ectopic implanted on caesarean section scar are also considered as ectopic pregnancy. (Fig1) The importance of ectopic pregnancy in the twenty first century has increased with the increasing incidence despite of decreasing mortality, whereas early diagnosis and management is the mainstay. Early diagnosis is only possible when people are aware of the condition. Being one of the major causes of maternal mortality and morbidity many studies have been carried out covering different aspects.¹ To the best of our knowledge there has not been a single study regarding the correlation between pre-operative hemoglobin levels with hemoperitoneum found at surgery. So this study tries to find out whether

there is real correlation between the preoperative hemoglobin level and the amount of hemoperitoneum.

Methods

This is a prospective study carried out in the department of Obs/Gyn, Tribhuvan University Teaching Hospital, Kathmandu, Nepal during the period of five years, 15 April 2002-14 April 2007 (Baisakh 2059 – Chaitra 2063). All the patients with ectopic pregnancy confirmed by laparotomy and histopathology were evaluated. Ruptured ectopic pregnancies with measurable hemoperitoneum were included in the study. Patients without hemoperitoneum, for example, those with spontaneous resolution of ectopic pregnancy, unruptured ectopic few that underwent medical therapy; or organized ectopic with the formation of tubo-ovarian mass, rudimentary horn rupture without hemoperitoneum were excluded. All

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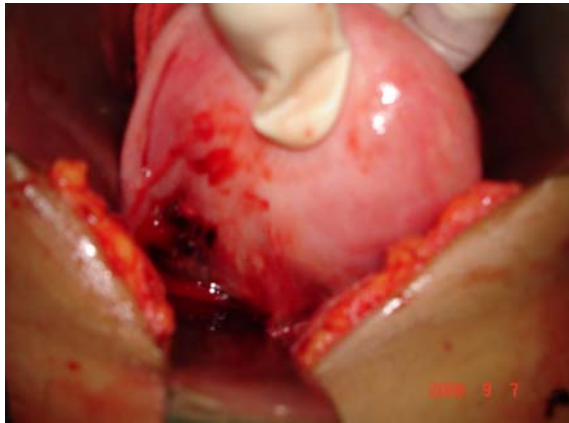


Fig 1. Uterine scar ectopic pregnancy in a 20 years old with history of cesaerean section 3 months back

the patients with suspected ectopic pregnancies were examined. Investigations specially, hemoglobin level which were sent from the emergency department were evaluated. The amount of hemoperitoneum was noted from the operation note after the laparotomy.

Datas were reconfirmed from patient’s interview, operation note and the record file.

The severity of anaemia was classified according to Indian Council of Medical Research (ICMR); describing Hb% ≥ 11 gm% as normal, 10-10.9 gm% mild, 7-10gm% moderate, <7 gm% severe and <4 gm% is very severe.² The preoperative Hb% and the amount of hemoperitoneum was correlated with regression equation(Y), where Y (Hb %) = $11.2 - 0.001 \times \{\text{hemoperitoneum (ml)}\}$. Y value >0.75 indicates high, <0.75 moderate and < 0.5 low degree correlation and the statistical significance is expressed in P value.

Result

A series of 167 ectopic pregnancies were managed at TUTH over the period of 5 years, constituting 0.963% of all deliveries (n=17, 324). One hundred and fifty cases of ectopic pregnancies with hemoperitoneum (confirmed during laparotomy) were included in the study. This suggested that 90% (n=150) of all ectopic pregnancy ruptured ending in hemoperitoneum.

Of 150, five cases which did not mention the amount of hemoperitoneum were further excluded and 145 cases were finally studied.

Normal Hb% was present in 10 (37.9%) and 90 (62.1%) presented with different categories of anaemia; severe (13), moderate (55) and mild (22).The maximum amount of hemoperitoneum present during laparotomy was ≥ 3000 ml (4) and minimum being 100ml (5) (Fig 2a/b). It has been noted that, almost half of the women 82 (56.5%) came seeking for surgical care, as soon as the

hemoperitoneum amounted to be within one litre (Fig 2a).

The correlation between hemoperitoneum and Hb% is shown in table1.

- ▶ All patients with <100 ml (5) of hemoperitoneum had normal Hb% i.e. ≥ 11 gm% and it is found to be statistically significant (p value 0.04).
- ▶ Hemoperitoneum of 100-500ml had normal Hb% in 18, anemia 20 [mild (8), moderate (11) and severe (1)].
- ▶ Those with 500-1000ml had normal Hb% in 16, anemia 23: mild (6), moderate (17), severe (0).
- ▶ Similarly 1000-1500ml hemoperitoneum had normal Hb% in 5, anemia 11[mild (3), moderate (8), severe (0)].
- ▶ Accordingly hemoperitoneum of 1500-2000ml had normal Hb% in 5, anemia 14 [mild (2), moderate (9), severe (3)].
- ▶ Whereas with 2000-2500ml had normal Hb% in 5 anemia 8(mild (2), moderate (2), severe (4)).
- ▶ Above all 2500-3000ml hemoperitoneum corresponded to normal Hb% in 1, anemia 10[mild (1), moderate (5) and severe (4)].
- ▶ And in last but not the least, where the hemoperitoneum was ≥ 3000 ml: none had normal Hb gm % and none had mild anemia in 4 [mild (0), moderate (3) and severe (1)] .

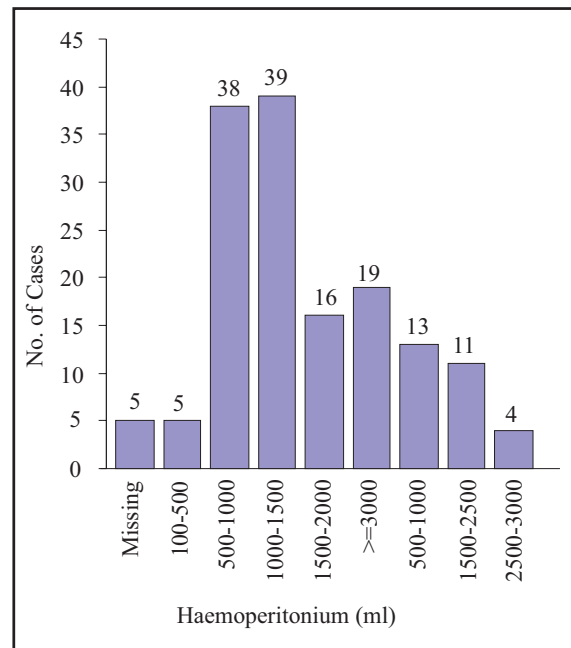


Fig 2a. Number of cases showing hemoperitoneum level.

Table1. Association between Hb% and Hemoperitoneum

Hemoperitoneum (ml)	Severe anaemia (4.0 - 6.9)	Moderate anaemia (7.0 - 9.9)	Mild anaemia (10.0 - 10.9)	Normal Hb% (= 11.0)	Total	p value
<100	0 0%	0 0%	0 0%	5 100.0%	5 100.0%	0.04
100-500	1 2.6%	11 28.9%	8 21.1%	18 47.4%	38 100.0%	0.12
500-1000	0 0%	17 43.6%	6 15.4%	16 41.0%	39 100.0%	0.15
1000-1500	0 0%	8 50.0%	3 18.8%	5 31.3%	16 100.0%	0.45
1500-2000	3 15.8%	9 47.4%	2 10.5%	5 26.3%	19 100.0%	0.43
2000-2500	4 30.8%	2 15.4%	2 15.4%	5 38.5%	13 100.0%	0.02
2500-3000	4 36.4%	5 45.5%	1 9.1%	1 9.1%	11 100.0%	0.005
>3000	1 25.0%	3 75.0%	0 0%	0 0%	4 100.0%	0.18
Total	13 9.0%	55 37.9%	22 15.2%	55 37.9%	145 100.0%	0.001*

According to Karl Pearson’s correlation coefficient (r) the correlation between preoperative Hb% and hemoperitoneum amount was 0.40 which signifies low degree of negative correlation between two which is statistically significant (p value <0.001) and this correlation is demonstrated in the linear regression curve with 95% mean prediction interval i.e. the level of Hb% is inversely proportionate to the amount hemoperitoneum. The linear regression also shows that R-square = 0.16, which means that the Hb% is affected

by hemoperitoneum amount by 16% and rest (84%) by other factors (Fig 3).

Discussion

Massive hemoperitoneum in ruptured ectopic pregnancy have often been found in different period with the reported incidence of ectopic as 0.7% (in 1977-1981); 0.86% (April 1993 – Dec 1996); 1.15 % (in 2001-2005) or settling for 0.963% of all deliveries in the

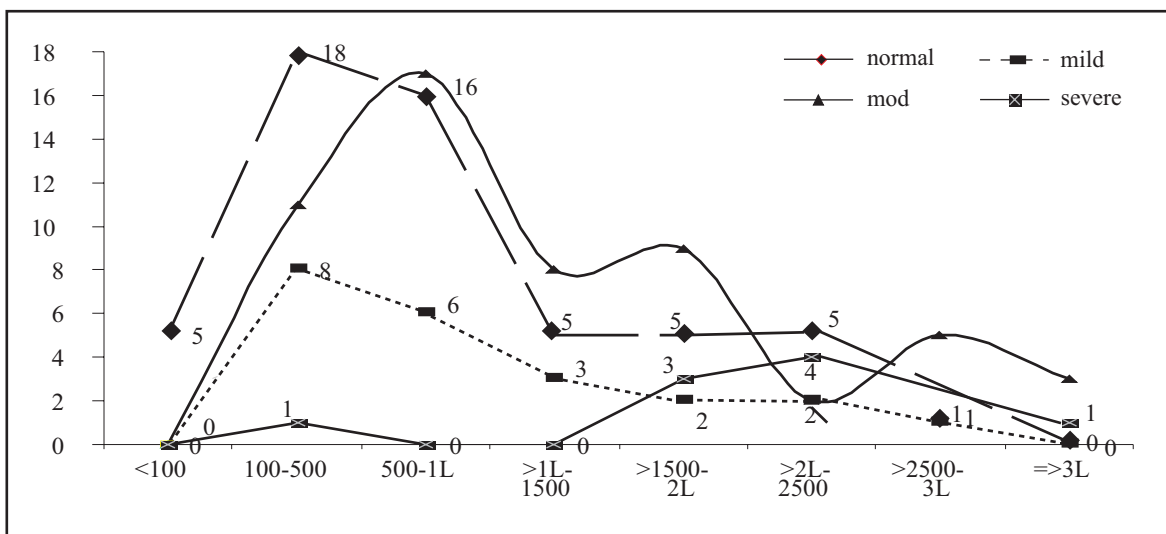


Fig 2b. Number of cases showing hemoperitoneum and Hb level.

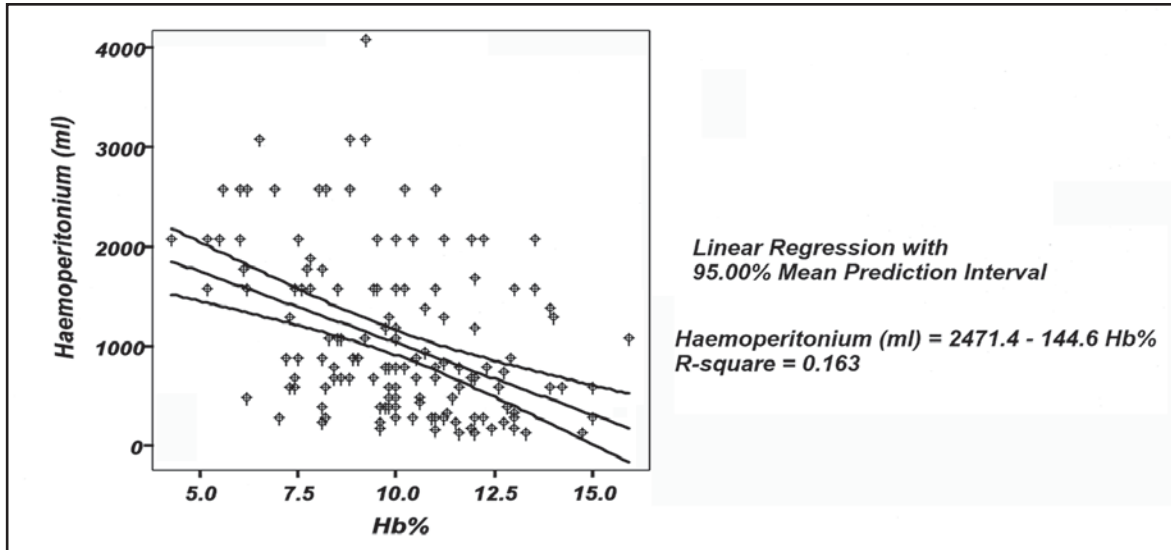


Fig 3. Linear regression curve showing correlation of Hb% and hemoperitonium with 95% mean prediction interval.

present study; and without the record of any maternal deaths during the last 10 years from efficient management.³⁻⁵ The low percentage of EP in the recent year might be because of the significant increase in the number of deliveries.⁶

The significant amount of hemoperitoneum preoperatively is synonymous to extra uterine pregnancy however it is not always so. There are numerous but rare gynecological causes for hemoperitoneum. A review of 429 cases of haemoperitonium illustrated 17 cases of hemoperitonium to a source not from rupture of EP.⁷ Rupture of corpus luteal cyst, follicular cyst specially those during anticoagulant therapy, rupture of any ovarian tumour, rupture of superficial vessels of myoma, a perforating mole, choriocarcinoma and gestational trophoblastic diseases (GTD in ectopic pregnancy; fallopian tube Bilharziasis and coagulation

disorders caused by AIDS also are a causative factor of hemoperitonium which has been reported in different literature.⁷⁻⁹

On the contrary a preoperative case of myoma measuring 8x8cms in an enlarged uterus corresponding to 12-14 weeks gestation was postponed from routine surgery in the day because of anemia (Hb 6gm%). Same case had to be rushed for surgery in the same evening when she developed acute pain and ultrasound detected significant amount of hemoperitonium. On laparotomy 2500 ml blood was evident from ruptured ectopic pregnancy. This had nothing to do with tear of the subcapsular veins of myoma as feared, myoma occupying intramural location. Hysterectomy was undertaken at the same time in our hospital¹⁰ (Fig 4 a & b).

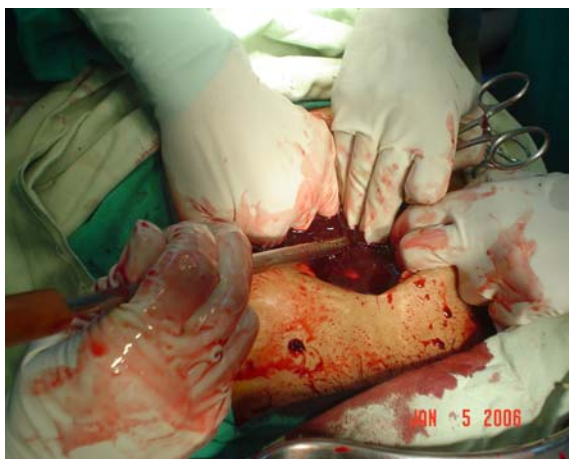


Fig 4a. Hemoperitonium due to ruptured ectopic coexisting with myoma.



Fig 4b. Myoma coexited with ruptured ectopic.

As in the literature pain has been the most common symptom in cases of EP with hemoperitoneum (100%). This pain is caused by escape of blood into the peritoneal cavity. Pritchard and Adams¹⁰ observed that 500 ml of blood to the peritoneal cavity most often cause abdominal tenderness, moderate intestinal obstruction, pain in top of the shoulder and side of neck from diaphragmatic irritation.

The correlation between the Hb% and hemoperitoneum according to Karl Pearson's coefficient (r) is found to be -0.40. This indicates low degree of negative correlation and this correlation is found to be statistically significant {(the association between the preoperative Hb % and hemoperitoneum is statistically significant when hemoperitoneum amount is <100 ml (p = 0.04), 2000-2500ml (p = 0.02) and 2500-3000ml (p = 0.005) and not significant in hemoperitoneum amount 100-500ml (p = 0.12), 500-1000ml (p = 0.15) and 1000-1500ml (p = 0.45), 1500-2000ml (p = 0.43) and ≥3000 ml (p = 0.18) however in total the association is found to be significant (p=0.001)}.

The limitation of the present study being unable to know the baseline individual hemoglobin level of all these women before their initial presentation in the Emergency Department with symptoms of rupture of ectopic pregnancy causing hemoperitoneum.

Conclusion

In cases of ectopic pregnancy the Hb% measured pre-operatively has a negative (inverse) correlation with the amount of hemoperitoneum and is found to be statistically significant.

References

1. Birkhahn RH, Gaeta TJ, Van Deusen SK, Tloczkowski J. the ability of traditional vital signs and shock index to identify ruptured ectopic pregnancy. *Am J Obstet Gynecol* 2003; 189:1293-6.
2. Sharma JB. Nutritional anaemia during pregnancy in non industrialized countries. In: John Studd. *Progress in Obstetrics and Gynecology* 15. London: Churchill Livingstone; 2003: 103-122.
3. Jha R Singh M Rana A, Bastola S. Ectopic Pregnancy: A Major Cause of Maternal Mortality?. *Journal of Nepal Medical Association* 2003; 42: 151-155.
4. Rana A, Pokhrel RP. A study of ectopic pregnancy at Teaching hospital. *JIOM* 1991; 13: 29-35.
5. Gurung G, Rana A. Diagnostic dilemma in cases of ectopic pregnancy: a five year prospective study at Tribhuvan University Teaching Hospital. *JIOM* 2006; 28: 30-2.
6. ICMR task force project, multicentric case- control study of ectopic pregnancy. *J Obstet Gynecol India* 1990 40; 425-30.
7. Picaud A, Oicaud A, Bennani S, Mba Allo L, Mouely G, Nlome-Nze AR, Ogowet-Igumu N. Unusual causes of hemoperitoneum of genital origin. *J Gynecol Obstet BIol Reprod* 1990; 19: 441-5.
8. Lubner M, mMenias C, Rucker C, Bhalla S, Peterson CM, Wang L, Gratz B. Blood in the belly: CT findings of hemoperitoneum. *Radiographics* 2007; 27: 109-25.
9. Sharma P, Rana A, Pradhan N, Gurung G, Pradhan S. Massive hemoperitoneum: Consequence to ruptured follicular cyst in a patient on warfarin. *Gyne/ Obs Annual Health letter* 2003; 9: 21-22.
10. Bratschi HU, Limacher F. Ruptured pedicled myoma node with hemoperitoneum. *Geburtshilfe Frauenheilkd.* 1986 Aug; 46(8):547-8.
11. Pritchard JA, Adams RH. The fate of blood in the peritoneal cavity. *Surg Gynecol Obstet* 1957: 105; 299.