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ORIGINAL ARTICLE

# Intraoperative Autologous Blood Transfusion of Peritoneal Blood During Laparotomy for Ectopic Pregnancy: Prospective Study

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**Abstract**
*Objective* The purpose of this study was to evaluate the efficacy and safety of intraoperative autologous blood transfusion during laparotomy for hemoperitoneum in ectopic pregnancy and also safety of homologous blood transfusion along with autologous blood transfusion.
*Method* Fresh blood, from peritoneal cavity, was collected for autotransfusion in sterile dish, filtered through eight layers of sterile gauze pieces, and collected in a sterile bowl. The collected blood was transferred into blood infusion bag containing citrate phosphate dextrose adenine solution in the proportion of five parts of blood to one part of citrate solution.
*Results* Mean volume of autologous blood transfused in patients without homologous transfusion was 573 ± 328. Mean preoperative hemoglobin was 4.95 ± 1.5, and postoperative hemoglobin was 6.85 ± 1.3. Hence, rise in hemoglobin was 1.9 g%. Autologous blood volume transfused in 29 patients (who required homologous blood transfusion) was 488 ± 216. Preoperative hemoglobin was 4.35 ± 1.94. The result was compared with other studies.
*Conclusion* Intraoperative autologous blood transfusion enabled the performance of laparotomy in hemodynamically unstable ectopic pregnancy patients without availability of homologous blood transfusion. Homologous blood transfusion is compatible with autologous blood transfusion.

**Keywords** Autologous · Homologous · Blood transfusion · Laparotomy

## Introduction

In the peripheral resource-poor hospitals where availability of donor blood is scarce and blood transfusion services are limited, women with ruptured ectopic pregnancy frequently present in poor clinical condition.

Intraoperative autologous blood transfusion is the technique of salvaging and subsequently reinstituting the blood which was collected as hemoperitoneum. It is already used for ectopic pregnancies [1] or ovarian bleeding with hemoperitoneum. Developed countries have used blood salvage devices, such as cell saver, to process and retransfuse the salvaged blood [2]. Several simple manual systems have been used in developing countries. In this article, we report the efficacy and safety of the intraoperative autologous blood transfusion technique using a manual system.

## Subjects and Methods

The subjects included in the study were 42 patients with clinically suspected large hemoperitoneum as a result of disturbed ectopic pregnancy, who underwent emergency

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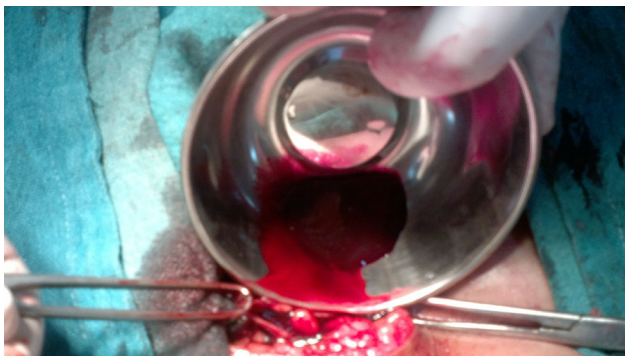

**Fig. 1** Collection of blood from peritoneal cavity

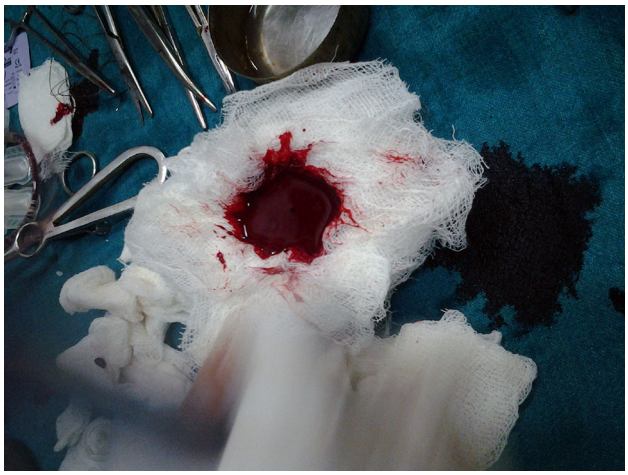

**Fig. 2** Filtration of blood through 8 layers of gauze pieces

laparotomy in the Obstetrics and Gynaecology unit of Gandhi Memorial Hospital during a 30-month period. Informed consent for the procedure and possible ill effects thereafter was obtained from relatives. Urine pregnancy test was performed on admission which was found to be positive in 39 patients, weakly positive in two, and negative in one patient. Prophylactic antibiotic treatment was administered after scrutiny of patients.

Hypovolemic patients were rapidly infused with sodium chloride solution/ringer lactate, while the patients were being rushed to operation theater. All patients were induced with spinal anesthesia. The sterilized equipment for autotransfusion was kept ready for use, comprising two small bowls to take out blood from peritoneal cavity; one bowl to sieve the blood; and one large bowl or kidney tray to collect the filtered blood. Eight layers of gauze were put one on another to be used as filter. Upon opening the abdomen, a small initial peritoneal incision was made (Fig. 1). Intraperitoneal blood appearing fresh was collected in the small bowl. After removing most of the fresh blood, the peritoneal incision was enlarged, and the

**Fig. 3** Filtered blood kept ready for transfusion

hemostatic clamp applied on mesosalpinx. The collected blood was filtered through a sieve composed of eight layers of sterile gauze to be collected into a sterile bowl (Fig. 2).

*Reinfusion* The filtered blood was transferred from the bowl to infusion bags, which was then reinfused into the patient (Fig. 3). Calcium gluconate was given to patients who received transfusion of three bags of blood.

## Result

Out of these 42 patients, 9 were nulliparous (one unmarried), 11 were primiparous, and 22 patients were multiparous. History of laparoscopic tubal ligation was present in two, dilatation and curettage in one, and self-abortifacient intake in one patient. All patients included in this study were in a state of hypovolemic shock. Cervical excitation tenderness was absent in collapsed patients with massive hemoperitoneum. Mean age of the patients was 27 ± 8.7. Site of ectopic was ampullary in 24, isthmic in 13, tubal abortion in two, ovarian ectopic in one, and heterotopic pregnancy in two patients. Autologous transfusion was done in all patients, 29 required homologous transfusion along with autologous transfusion. Hemoglobin levels of all the patients were checked preoperatively and 48 h postoperatively.

Mean volume of autologous blood transfused in 13 patients (without homologous transfusion) was 573 ± 328. Their mean preoperative hemoglobin was 4.95 ± 1.5, and postoperative hemoglobin was 6.85 ± 1.3. Mean rise of hemoglobin was 1.9 g%. Later, all the anemic patients received total dose infusion of iron.

Mean autologous blood volume transfused in 29 patients (who received homologous blood transfusion) was 488 ± 216. Mean preoperative Hb was 4.35 ± 1.94. Mean

volume of autologous transfusion was 85 cc more in patients who did not receive homologous transfusion.

No adverse reaction occured due to autotransfusion during intraoperative period, except one patient who had shivering. No adverse reaction was seen in autologous along with homologous blood transfusion in postoperative period too. None of the patients developed postoperative fever or wound sepsis. All patients were discharged on the seventh postoperative day. There was no mortality in this series. Other adverse outcomes, such as bleeding tendency or embolism, were not found in any subject.

The above results were compared with other studies (Tables 1, 2, 3).

**Table 1** Autologous blood transfused in different studies

| Simple Salvage Method | Autologous blood transfused (ml) |
|---|---|
| Pathak et al. [3] | 915 [a] (250–3,000) |
| Maleki et al. [4] | 1,800 [a] (1,500–2,500) |
| Price et al. [5] | 2,000 |
| Ansaloni et al. [6] | 1,014 [b] (348) |
| Jongen et al. [7] | 1,239 (500–1,500) |
| Awojobi et al. [8] | 1,252 [a] (500–3,000) |
| Present Study | 573 [b] (328) |

Mean volume transfused in the present study was less than the other studies

[a] Mean (range)

[b] Mean standard deviation

**Table 2** Comparison of pre and post transfusion hemoglobin

| Study | Presurgery Hb | 3–7 days postsurgery Hb |
|---|---|---|
| Pathak et al. [3] | 8.1 | 9.5 |
| Maleki et al. [4] | 7.5 | 12.4 |
| Price et al. [5] | 5.0 | 9.0 |
| Ansaloni et al. [6] | 7.5 [a] (3.3) | 8.6 [a] (2.8) |
| Present Study | 4.95 [a] (1.5) | 6.85 [a] (1.3) |

Mean postsurgery hemoglobin was higher in all studies in comparison with presurgery hemoglobin

[a] Mean ± standard deviation

## Discussion

Autotransfusion is useful alternative for blood replacement and augmentation of blood oxygen-carrying capacity. In the literature, various complications with autotransfusion are noted, such as infection, pulmonary edema, coagulopathy, and air embolism, but reports of complications are uncommon [2].

There is no risk of reaction caused by mismatched and massive homologous blood transfusion. Blood retrieval and filtering is simple, without any need for typing and cross-matching; hence, blood is readily available to transfuse, while a waiting for arrangement of homologous blood transfusion is eliminated.

Developed countries have used blood-salvaging devices which do not appear to offer advantages over manual devices, although no comparisons have been made so far in randomized trials [6].

## Conclusion

Autologous transfusion in ectopic pregnancy is a safe, simple, instantly available, and well-accepted method of blood transfusion. It enables performance of laparotomy for large hemoperitoneum in hemodynamically unstable patients. Homologous blood transfusion is compatible with autologous transfusion whenever required in postoperative period.

Hence, autologous transfusion is a life-saving infusion method compatible with RBCs' platelets and other blood components too, but to what extent remains yet to be explored.

**Table 3** Complications of autologous blood transfusion

| Simple salvage autotransfusion study | No. and type of transfusion | | Complication related to SABT |
|---|---|---|---|
| | SABT | SABT + DBT | |
| Pathak et al. [3] | 168 | 362 | Transient hyperpyrexia transient oliguria |
| Laskey et al. [9] | 58 | – | Pulmonary edema |
| Jongen [7] | 48 | – | Death × 12 pulmonary embolism |
| Obiechina [10] | 64 | 38 | None |
| Awojobi [8] | 107 | – | None |
| Present Study | 42 | 29 | Shivering |

*SABT* Salvage autologous blood transfusion, *DBT* donor blood transfusion

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