

Letters to the Editor

Congenital Dyserythropoetic Anemia with Sideroblasts and Ringed Forms

To the Editor. Congenital dyserythropoietic anemias (CDA) are a group of hereditary refractory anemias characterized by ineffective erythropoiesis, typical morphological abnormalities of erythroblasts, low or no reticulocyte response, hyperbilirubinemia and splenomegaly.¹ We report a case of CDA with ringed sideroblasts presenting neonatally. This is a rare finding in CDA.²

Case Report

A full-term male Saudi infant presented after delivery with pallor, splenomegaly (6 cm below left costal margin) and a systolic murmur over the left precordium. CBC showed hemoglobin at 11.8 g%, hematocrit 36.8%, mean corpuscular volume (MCV) 100 fl, and reticulocytes at 12.5%. Peripheral blood smear suggested erythroblastosis fetalis. Hb electrophoresis showed Hb A₁ at 21.3%, Hb F 70.9%, and Hb Bart's at 7.2%. G6PD screen was normal. Echocardiography showed a small ventricular septal defect and patent ductus arteriosus. The diagnosis of a-thalassemia, probably Hb H disease, was initially considered.

On the fourth day of life, the Hb dropped to 9.7 g% and the patient was transfused. Two months later, the Hb dropped to 4.2 g% and a second packed RBC transfusion was given. At age of 4½ months, Hb was 5.8 g%, MCV 77 fl, and reticulocytes 2.5%. Repeat Hb electrophoresis showed Hb A₁ at 99%, and Hb A₂ at 1%. Hb H preparation as well as acidified serum (Ham) test was negative. Serum ferritin was high. Bone marrow aspiration showed brisk erythropoiesis with dyserythropoietic features such as moderate megaloblastic morphology, binuclearity, cytoplasmic bridges, many mitotic granules and occasional ring sideroblasts.

Discussion

CDAs are a group of hereditary refractory anemias characterized by ineffective erythropoiesis, typical morphological abnormalities of erythroblasts, low or no reticulocyte response, hyperbilirubinemia and splenomegaly.³ CDA can be diagnosed in early childhood, however, diagnosis is complicated due to poor knowledge of the morphological criteria and the large number of differential diagnoses that have to be excluded.⁴

Our patient had an early onset of anemia and splenomegaly (at birth) He had sideroblasts in the bone marrow with occasional ring forms, which is a rare finding

in CDA.² Absence of microcytosis and hypochromia makes sideroblastic anemia unlikely.⁵

The first Hb electrophoresis revealed a picture of a-thalassemia trait. The level of Hb Bart's (7.2%) should have been considered relatively low for Hb H disease.⁶ The correct diagnosis of CDA was made at the age of 4½ months after presentation. However, the mean age for establishing the correct diagnosis seems to be much later in other reports.⁷

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Collection of Umbilical Cord in Cesarean Section and Vaginal Delivery

To the Editor: The structural and functional integrity of hematopoietic system is maintained by CD34+ hematopoietic stem cells (HSC), showing the important characteristic to self-renew, producing other stem cells or differentiating from various hematopoietic lineages.¹ HSC transplantation is nowadays considered an important resource for attempting therapy against certain hematological and malignant disorders. Umbilical cord blood (UCB) contains a high number of these cells which, according to previous experience, possess significant advantages in terms of proliferative capacity and immunologic reactivity for clinical application, in comparison to the use of bone marrow.² This source of

hematopoietic stem cells is characterized by the ease of procurement, absence of risk to the donor, and the less likelihood of transmitting clinically important infections, especially *Cytomegalovirus* and Epstein Barr virus.³ Moreover, several researchers have indicated that umbilical cord blood can be given *in vivo* to fully and partially HLA-matched sibling or non-familial recipients for the hematopoietic system reconstitution in genetic disorders, as well as in malignancies. In comparison to adult peripheral blood, UCB shows decreased immune responses to alloantigens and report low incidence of graft versus host disease but sufficient graft versus leukemia activity, as this is important for the risk of relapse and thus of mortality.⁴

Much research has been performed worldwide,⁵⁻⁸ and many UCB banks have been instituted in the US and Europe, since Gabutti, for the first time, collected and isolated several fetal hematopoietic progenitor cells from the residual placental blood after delivery and ligation of the umbilical cord.⁵⁻⁹ Also in Italy, banks belonging to the GRACE group of Milan have been connected to the European Netcord. Recently, a new UCB bank was instituted at Sciacca (Sicily) in Italy. It has recently been officially affiliated to the GRACE group (ISO 9002 certification). Our aim in this study was to evaluate the difference between UCB samples collected during vaginal delivery and cesarean section, particularly the blood volume collected and CD34+ stem cell count (Table 1).

Materials and Methods

Since its inception, the Obstetrics and Gynecology Department of the University of Catania has been involved in the collection of UCB samples. From December 1999 to February 2002, 1495 samples were collected and sent to the Sciacca bank. Of these, 744 were collected from newborns delivered vaginally, while the remaining were collected from cesarean section deliveries.

All deliveries were performed under epidural or local infiltrative anesthesia and no uterotonic drugs were given before cord clamping. No significant obstetric complications were recorded. All infants were at term and none suffered any cardiopulmonary distress in the neonatal period.

We measured the time lapse from birth in a vertex presentation of the buttocks to the moment when the umbilical cord was clamped. We evaluated the volume of blood collected and the number of CD34+ cells contained in the fetal cord blood according to the kind of delivery.

The method of blood collection consisted of puncturing the umbilical cord vein with an 18-gauge needle and withdrawing the blood in a sterile bag containing 21 mL of CPD anticoagulant (citric acid monohydrate 3.27 g, sodium citrate dihydrate 26.3 g, sodium dihydrogen phosphate

TABLE 1. Collection of umbilical cord blood samples data.

	Cesarean Section (n=751)	Vaginal Delivery (n=744)	P-value*
Cord blood volume (mL)	76±26	67±22	0.10**
Cord blood CD34+ (x10 ⁵)	29±5	26.4±2.6	0.08**

*Mann-Whitney U test; **not statistically significant.

dihydrate 2.51 g, glucose monohydrate 25.5 g, water for injections to 1000 mL) (Compoflex CB Collect™, NPBI International BV, Emmer Compascuum, Holland) immediately after clamping. The blood was collected when the placenta was still *in utero*. After vaginal delivery of an infant, the compression of the placenta operated by the uterine contractions forces blood from the placenta to the infant and hastens placenta transfusion. The blood contained in a still *in situ* placenta flows by gravity from the umbilical cord to a sterile collection bag.

Collection of the blood was approved by the local ethics committee; and informed consent was obtained from the mothers. We also collected blood from the mothers to confirm the suitability of the donation.

Results

The results of our analysis showed that UCB volume and the number of CD34+ cells collected were similar between the two groups (Table 1). The higher median volume of blood collected from infants delivered through cesarean section seems mainly due to the different clamping time rather than the kind of delivery.

Discussion

As reported, there was no statistically significant difference between the quantity and the quality of blood collected during cesarean sections and vaginal deliveries. This has important implications in the selection of the kind of delivery performed when a pregnant woman has a child affected by a disease treatable with stem cell transplantation. These cells can be obtained from either the newborn's fetal cord blood or from the bone marrow, if it is HLA compatible. In such cases, it is not necessary to perform a cesarean delivery in an attempt to collect a higher blood volume, and consequently a higher number of transplantable fetal HSC.

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The Pattern of Surgically Treated Thyroid Diseases in the Bisha Region of Saudi Arabia

To the Editor: Thyroid enlargement is not a rare surgical problem. The incidence and pattern of surgically treated thyroid diseases (goiters) in various regions of Saudi Arabia differs significantly.^{1-3,5,6} Bisha is a relatively high altitude territory (1200 m above sea level) with a population of around 126,000. No study has previously been conducted in the past to evaluate the pattern of surgically treated thyroid diseases in the region. Thus, we retrospectively analyzed the incidence, causes and pattern of the treated goiters in this region and compared it with other studies in Saudi Arabia.

Patients and Methods

This retrospective study was carried out in Prince Abdallah Bin Abdulaziz Hospital, Bisha, which is a secondary care hospital with 345 beds. It is also a referral hospital for various primary health care centers and other smaller hospitals in the region.

The data was retrieved from from April 1995 to October 2001, and included a total of 100 patients. Information on age, sex, nationality, causes and pattern of the goiters and final histopathology report was available. The data were collected, analyzed, and then compared with the results of some national and international studies.

Results

Of the 100 patients, 86 (86%) were Saudi nationals and the remaining 14 (14%) were non-Saudis. Female patients constituted 88%, thus female to male ratio was 7.3:1. Their ages ranged from 12 to 76 years (mean 32 years). Age and sex distribution of goiters is shown in Figure 1.

Multinodular goiter and adenoma (solitary nodule) constituted 60% of the cases (31% and 29%, respectively). Toxic goiter was seen in 7% of patients and all either failed to respond to medical treatment or had recurrence after cessation of treatment. Autoimmune thyroiditis was seen in

FIGURE 1. Age and sex distribution of goiters in Bisha region.

TABLE 1. Causes of goiter in surgically treated patients in Bisha region.

Causes of goiter	No. of cases n (%)
Multinodular goiter	31 (31%)
Adenoma (solitary nodule)	29 (29%)
Thyroid malignancy	14 (14%)
Toxic goiter	7 (7%)
Autoimmune Hashimoto's thyroiditis	9 (%)
Chronic lymphocytic thyroiditis	2 (2%)
De-Quervain's thyroiditis	1 (1%)
Cysts in thyroid	7 (7%)
Total	100 (100%)

11 (11%) patients (all females), 9 had Hashimoto's thyroiditis, while 2 had chronic lymphocytic thyroiditis. One case (1%) was diagnosed as De-Quervain's thyroiditis. Cyst in the thyroid was present in 7 (7%) patients, and thyroid malignancy was found in 14 (14%) patients, of which papillary carcinoma was the most common in 13 patients (92.8%). In one case, Hurthle cell carcinoma was diagnosed (1%). The different causes of goiter are summarized in Table 1.

The incidence of both benign and malignant thyroid diseases was not different between Saudi and non-Saudi patients. The incidence of thyroid malignancy was found to be significantly higher in patients between 20-40 years of age. Twelve out of 14 patients (86%) developed malignancy between the ages of 20-40 years, while two patients (14%) had malignancy above the age of 40 years.

Discussion

This study represents a general overview of surgically treated thyroid diseases in the Bisha region. Table 2 shows a comparison with other studies from Saudi Arabia and other parts of the world. The incidence of multinodular goiter in our study was comparable with other studies done in Riyadh¹⁻³ and Yemen,⁴ while it was low compared to another study in Jeddah, whose incidence was relatively high at 60% compared to 31% in ours. Similarly, the

TABLE 2. Comparison of the pattern of thyroid diseases with different studies.

Country	Author(s)	No. of patients	MNG (%)	Adenoma (%)	Toxic goiter (%)	Autoimmune (%)	Malignant (%)
Yemen	Al-Hureibi et al ⁴	282	33.7	49	1	–	3.9
Ethiopia	Mengistu ⁸	373	22.3	23.6	43.7	1.2	0.3
Libya	Elhamel et al ⁷	618	44.5	32.5	9.5	3.7	9.7
Riyadh, Saudi Arabia	Kona & Al-Mohareb ³	172	38.4	12.2	9.9	9.3	25
Riyadh, Saudi Arabia	Mofti et al ¹	158	31	30	5	3	29
Riyadh, Saudi Arabia	Al-Tameem ²	380	28.1	27.3	14.7	6.6	21.3
Jeddah, Saudi Arabia	Nasr ⁵	–	60	8.7	10.2	–	14.5
Assir, Saudi Arabia	Abu-Eshy et al ⁶	361	43.7	24.6	7.7	6.4	13
Bisha, Saudi Arabia	Current study	100	31	29	7	11	14

MNG=multinodular goiter.

incidence of solitary nodule (adenoma) was also comparable with other studies from Riyadh,^{1,2} Assir,⁶ Libya,⁷ and Ethiopia,⁸ but was much higher in our study compared to the Jeddah study (29% vs. 8.7%). The incidence of toxic goiter was fairly comparable with other studies, while cases of autoimmune thyroiditis were found to be higher as compared to other regions of the Kingdom (Assir,⁶ Jeddah⁵) and studies from Libya⁷ and Ethiopia.⁸

As far as thyroid malignancy is concerned, although its incidence was higher in our study (14%) as compared to reports from the US (5.8%),⁹ South Africa (5.4%),¹⁰ Yemen (3.9%),⁴ Libya (9.7%),⁷ and Ethiopia (0.3%),⁸ it was comparable with studies in Jeddah⁵ and the Assir region.⁶ In our study, papillary carcinoma was the most common malignancy observed (92.8%), and was at a high frequency in all age groups studied. Of some 25 retrospective analyses of 12,855 treated cases of differentiated thyroid carcinomas from North and South America, eight European countries and Japan (between 1980 and 1990), papillary carcinoma accounted for 50%-89% of all cases of malignancy.¹¹

Of 1736 patients with differentiated thyroid carcinoma treated at the Mayo clinic between 1945 and 1985, almost 90% had papillary carcinoma.¹¹ This result from Mayo clinic was similar to that reported from France,¹² Ireland,¹³ and Japan.¹⁴ The mean patient age of 44 years at the Mayo clinic does not compare with our experience. Mazzaferri, however, reported a mean patient age of 32.3 years in his US Air Force study.¹⁵

One interesting finding in our study was that all malignant thyroids were only of two types, i.e., papillary carcinoma (92.8%) and Hurthle cell carcinoma (7.2%) whose incidence is less than 3% in most of the studies. No follicular, medullary or anaplastic carcinomas and lymphomas were found in our analysis. The reason why follicular carcinoma cases have reduced may be due in part to the recently observed increase in the dietary intake of iodine by the Saudi population.

Our findings regarding the association of thyroid lymphoma with Hashimoto's thyroiditis are not comparable with the international figures and with studies in the Kingdom. Also our study disagrees with the previous reports that Hashimoto's thyroiditis is predominant in the old age group. In this study, we found out that 66.6% of

cases belonged to age group between 20-40 years while the others (33.4%) belonged to age group between 41-60 years. However, we agree with other studies that this disease is predominant in females.

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Torsion of Wandering Spleen: Case Report and Literature Review

To the Editor: Wandering spleen is an uncommon entity characterized by the presence of the spleen in a location other than the left upper quadrant, and the absence of its usual ligamentous attachments to the diaphragm, colon and retroperitoneum.¹ Wandering spleen has been described in the literature since the 19th century with different characteristics, such as displaced, ectopic, floating, movable and drifting.² Splenoptotic (wandering spleen) is, however, the most accurate, common and descriptive term.² The precise cause is not known. The majority of cases present as an acute abdomen associated with torsion and subsequent splenic infarction.

Case Report

A 14-month-old Jordanian male infant presented to the Pediatric Department with a one-day history of fever, pallor, abdominal tenderness and distension. A huge mass which was tender and firm was found occupying almost all the area of the abdomen. Laboratory tests showed WBC of 22500 (N 80%, L 20%), Hb 4.8 g/dL, plt 242000, ESR 107 mm/hr, and CRP+3. Both liver and renal function tests were normal. Blood film revealed neutrophilic toxic granulation, and no blast cells were seen. Bone marrow examination was normal. Abdominal CT scan revealed a huge spleen that was horizontalized and crossing the midline with multifocal splenic hematoma. The patient was given broadspectrum antibiotics (ampicillin and third-generation cephalosporins), and received urgent blood transfusion.

During hospitalization, he developed symptoms and signs of intestinal obstruction with bilious vomiting and increasing abdominal distension and tenderness. He was transferred immediately to the pediatric surgery unit where an urgent laparotomy was performed. At surgery, the huge spleen was found pushed downwards, twisted several times around its pedicle and had multiple areas of infarction with thrombosis of the splenic vessels. The spleen was not considered to be viable and splenectomy had to be done.

The patient had an uneventful recovery and was discharged five days after surgery. He received pneumococcal vaccine and has been on prophylactic penicillin since. After three years of regular follow-up, he was doing well and had had no major medical problems.

Discussion

Wandering spleen with torsion of the pedicle is rarely encountered. Among 1003 splenectomies performed at the Mayo Clinic between 1904 and 1945, wandering spleen was found in only two patients.^{4,5} Wandering spleen can be either acquired or congenital. The acquired anomaly has been attributed to weakness of the abdominal wall, multiple pregnancies, hormonal changes or increase in size of the spleen with a long pedicle.⁶⁻⁸ Congenital wandering spleen is thought to be due to abnormal development of the dorsal mesogastrium,⁸ as the spleen arises as a condensation of mesoderm in the dorsal mesogastrium. The most commonly described clinical picture is the presence of a palpable mass associated with abdominal discomfort.^{6,9} Torsion is the most common complication¹⁰ which may be acute, chronic, or recurrent. Spontaneous torsion and detorsion of the splenic pedicle has been postulated as a cause of intermittent vague abdominal pain with an evanescent abdominal mass. If gradual occlusion of the splenic vein occurs, bridging collaterals develop along with gastric varicosities. Moreover, chronic venous congestion causes marked splenomegaly and hypersplenism.^{11,12} Complications of an acute splenic torsion may include infarction, gangrene, abscess, local peritonitis, signs of asplenism, intestinal obstruction, and necrosis of the pancreatic tail.¹³

Clinically, the diagnosis can be suspected when a firm, movable abdominal mass is felt within the notched border. A plain abdominal film may suggest the abnormal location of the spleen.¹⁴ Ultrasound is a non-invasive and reliable examination and should be performed in all suspected cases.^{15,16} It reveals the typical echodensity and organ configuration of the spleen in an ectopic position with a clear visualization of the congestive pedicle.⁴ A radionuclide liver spleen confirms the splenic nature of the mass.¹⁷⁻¹⁹

Diagnosis is suggested by the known splenic mobility, the finding of a tender spleen and supported by the poor splenic uptake on liver-spleen isotope scan. Such a combination of findings is consistent with splenic torsion.²⁰

Nonoperative treatment has a complication rate reported to be as high as 65%.²¹ Splenectomy had previously been accepted as the treatment of choice,^{10,22} mainly because of the high mortality (20%-40%) associated with torsion of the spleen,^{6,16} the previous unsuccessful attempts at fixation,^{6,23} and the lack of awareness in the past of the important role of the spleen in the immunologic response to infection. Indeed, Abell²² in 1933 stated that "the ease with which other tissues rich in reticuloendothelial cells compensate for its loss invalidates any objection as to a loss of its function."

However, the vital function of the spleen is now beyond doubt. Overwhelming post-splenectomy infection is a well-recognized entity that can present at any time after surgery regardless of the indication of splenectomy, with an extremely high mortality.^{21,24-26} Therefore, the indications of

splenectomy have been revised and every effort should be made to try to preserve the spleen. Splenectomy now is performed only in patients with splenic torsion in whom massive infarction and thrombosis of the splenic vessels has occurred.

In the last several years, various techniques of splenopexy that saves the spleen, preserves its function and attempts to normalize the anatomy have been described. These include formation of an extraperitoneal pocket,¹ colonic displacement,²⁷ suture splenopexy,²⁸ or anchoring the spleen by the covering omentum.³

In conclusion, wandering spleen is a rare entity that presents mainly as abdominal mass. Every effort, especially by splenopexy, should be made to preserve the spleen.

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Red Blood Cell Transfusion Practice In Gynecology And Obstetrics In A Primary Care Hospital

To the Editor: The audit has become an essential tool in the management of the blood transfusion sector of healthcare. The audit is based on a set guidelines to determine the difference between the directions given and what has actually been done.¹ Review of blood ordering habits and blood utilization statistics can help in measures to regulate blood ordering and utilization, and thus help in improving these services.² This study was carried out at a primary care hospital to evaluate the red blood transfusion practice in gynecology and obstetrics.

Material and Methods

This study was carried out at the Armed Forces Hospital in Sharourah, Kingdom of Saudi Arabia, from January 2000 to December 2001. There are written standing order procedures (SOP) for maximum surgical blood ordering schedule (MSBOS) and guidelines for blood components utilization in this hospital. The Gynecology and Obstetrics ward is comprised of 20 beds. During the study period, 2349 patients were admitted in this ward. The laboratory and hospital records were examined and analyzed for all red blood cells transfusion events in the ward during this period. The cross-match to transfusion ratio was used as a measure of the efficiency of blood ordering practice. (This match should ideally be between 2-2.5:1). Figures more than these values were considered over-ordering. The appropriateness of red cell transfusion was judged by comparison with guidelines of the American College of Physicians.

Results

During the study period, a total of 1278 cross-matches were done and 495 red blood cell concentrates were

transfused to patients (Table 1). A total of 401 cross-matches were done for patients for whom cesarean section was planned and only 72 red concentrates were transfused to these patients (C:T ratio of 5.56:1). The cross-match to transfusion ratio was more than 2.5 in intra-uterine fetal death, multiple pregnancies and hysterectomy. Though 83 and 80 cross-matches were done for dilation and curettage (D&C), and threatened abortion respectively, no blood was transfused to any patient. A total of 329 red cell packs were transfused to pregnant patients with anemia. The hemoglobin levels of these women were between 61 g/L to 105 g/L, with a mean value 83.1 g/L. Of these, 273 (82.97%) were transfused between 70-100 g/L hemoglobin levels. The indications for transfusion in these patients were not endorsed in the patients' records. Two patients were transfused at hemoglobin >100 g/L without mention of the reasons.

Discussion

Obstetricians and gynecologists generally care for more patients with conditions potentially requiring blood, such as postpartum hemorrhage, placenta previa and ruptured ectopic pregnancy. For sudden unexpected need of blood transfusion in these conditions, the ordering of blood is frequently based on subjective anticipation of blood loss instead of evidence-based estimates of an average requirement in a particular procedure. There has been concern about the excessive ordering and inappropriate use of blood in gynecology and obstetrics practice.³

The cross-match to transfusion ratio is used as a measure of the efficiency of blood ordering practice. C:T ratio should ideally be between 2-2.5:1. This means that about 30% of the cross-matched blood should have been needed for transfusion. Any figure more than this is not justified.⁴ Our results revealed that the C:T ratio has been more than 2:1 in cesarean section, dilation and curettage, threatened abortion, multiple pregnancies and hysterectomy. This observation indicates over-ordering of blood. This practice has led to the holding of blood because cross-matched blood was considered reserved blood. Sixty-three outdated bags of blood were discarded during this study period. There appears to be many causes for a high C:T ratio including lack of clinical audits and lack of communication between gynecologists and hematologist.⁵

Although the patient's hemoglobin level is important, it should not be the only factor considered before red blood cells are given. Consideration should also be given to etiology, hemodynamic stability and signs and symptoms of tissue hypoxia. Use of red cells is likely to be inappropriate

Cesarean section	401	72	5.56:1
D & C	83	–	–
Threatened abortion	80	–	–
High risk labor	75	21	3.57:1
Ante-partum hemorrhage	56	32	1.75:1
Post-partum hemorrhage	40	23	1.73:1
Intra-uterine fetal death	32	7	4.57:1
Ectopic pregnancy	15	6	2.5:1
Multiple pregnancies	10	3	3.33:1
Hysterectomy	6	2	3:1

when Hb > 100 g/L unless there are specific indications. If red cells are given at this hemoglobin level, reasons should be well documented in the patient's record. Use of red blood cells may be appropriate when Hb is in the range 70-100 g/L. In such cases, the decision to transfuse should be supported by the need to relieve clinical signs and symptoms. Use of red blood cells is likely to be appropriate when Hb < 70 g/L.⁶ In this study, any patient having hemoglobin level < 100 g/L was transfused irrespective of their clinical status. This practice was contrary to the hospital guidelines.

Cross-match or type and screen (T&S) are two approaches that can be followed to ensure the availability of blood to patients.⁷ Cross-match involves incubation of the patient's serum with the donor red blood cell; if it is compatible, the donor unit is reserved exclusively for the identified patient for up to 72 hours. In T&S, the patient's serum is incubated with pooled RBCs containing all common RBC antigens. If no reaction occurs, the patient can safely have ABO and rhesus-compatible blood available in the blood bank. If the T&S is performed preoperatively, blood can be provided rapidly on request following a 2-minute spin cross-match. If the RBC pool screen is positive, then the antibody is identified and a conventional cross-match performed. This T&S method avoids the non-utilization of cross-matched blood. This method has been thoroughly validated.⁸ Unnecessary cross-matching is costly and wasteful, and can put a strain on blood banks where resources are limited.

In order to rationalize blood ordering, maximum surgical blood ordering schedule (MSBOS) should be followed. MSBOS is a list of commonly performed elective surgical procedures with a maximum number of units of blood to be cross-matched preoperatively and procedures in which T&S may only be needed. The goal of the MSBOS is to make preoperative blood orders coincide more closely with the actual number of units that will be transfused to patients during or immediately after surgery. It has been reported that MSBOS is the most effective method of reducing excessive blood cross-matching.⁹ It is recommended that MSBOS should be revised yearly on the basis of the latest available data to keep it responsive to the changing needs of the hospital.¹⁰

Recommendations

TABLE 1. Cross-match to transfusion ratio in different procedures/diseases.

Procedure/disease	Cross-match	Transfusion	C/T ratio
Deliveries accompanied by anemia	480	329	1.45:1

1. Type and cross-match should be requested for patients with:
 - deliveries accompanied by anemia with Hb<70 g/L.
 - significant antepartum hemorrhage.
 - known or suspected placenta previa or marginal placenta previa.
 - known coagulation abnormalities with high chance of peripartum bleeding.

In the absence of the above conditions, a type and screen should be requested for patients.

- Clinical and laboratory indications for red blood cell transfusion should be accurately recorded in the patient's medical record.
2. Dissemination of the blood component guidelines regarding their appropriateness to gynecologists should be done.
 3. Particular attention should be paid to implementation of the MSBOS. A strong institutional commitment is required for its implementation.
 4. A process for clinical review should be in place to monitor the ordering and appropriateness of blood transfusion.
 5. Good communication between clinicians and blood bank physicians is vital for the implementation of the component therapy guidelines.

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