The Impact Of A Cash Driven Health Care System On Blood Utilization : An Analysis Of Blood Utilization During Elective Surgeries At The University Of Nigeria Teaching Hospital Ituku-Ozalla- A Pilot Survey

A A.O, A V.O, E R.L

Citation

A A.O, A V.O, E R.L. *The Impact Of A Cash Driven Health Care System On Blood Utilization : An Analysis Of Blood Utilization During Elective Surgeries At The University Of Nigeria Teaching Hospital Ituku-Ozalla- A Pilot Survey*. The Internet Journal of Tropical Medicine. 2009 Volume 7 Number 1.

Abstract

One of the tasks of the anaesthetists includes making a decision on the need for blood transfusion during surgical procedure. This task though daunting in the face of epileptic blood supply, will save lives, but may result in over ordering and wasting of blood. AIMS/OBJECTIVES 1 To assess the efficacy of blood ordering practice.2 To assess the feasibility of a prospective random work to develop practice guidelines. MATERIALS AND METHODS: A prospective study involving patients booked for elective surgical procedures who were asked to provide blood for the surgery. The study spanned a period of three months and variables included pre/ post operative haemoglobin level estimation, duration of surgery, blood loss, number of units of blood provided and number of units of blood transfused. Cross-match/transfusion ratio, degree of over/under transfusion, and transfusion index, transfusion probability were calculated. ResultsCross match to transfusion ratio is higher than 2.5: 1 during procedures such as thyroidectomy, cholecystectomy, and myomectomy, elective caesarean section but lower during open prostatectomies, laminectomy and aneurysm surgery . Logistic problems affected post operative haemoglobin estimation but from the few that had their post operative haemoglobin level checked, the patients were under-transfused.Conclusion There is definitely over-ordering of blood which needs to be minimized by changing the blood ordering pattern through the development of a maximum surgical blood ordering schedule. Provision of refrigerators for storing blood in the theatre (theatre mini blood bank) would limit the need for palpable blood in the theatre before it is needed and help in preventing ageing of blood.

INTRODUCTION

In this modern era, a lot of emphasis is placed on providing patients with quality care during anaesthesia for surgery. This quality care includes the decision to transfuse intra-operatively which in turn is dependent on the availability of blood. In the absence of explicit maximum surgical blood ordering schedule, blood ordering depends on subjective anticipated blood loss. Blood over-ordering is thus common[(1)], especially in the face of our cash driven health care system and not so reliable blood bank. Blood is usually provided by the patient, resulting in demands from the anaesthetist to ‘palpate’ the blood before induction of anaesthesia.

AIMS/ OBJECTIVES

1. To audit/record the current practice of blood ordering for elective surgery
2. To determine the efficacy of blood utilization during elective procedures
3. To determine the feasibility of formulating a maximum blood ordering schedule in the hospital

MATERIALS/METHODS

This is a prospective survey of blood ordering practice for elective surgical procedures in the University of Nigeria Teaching Hospital Ituku-Ozalla over a period of three months. All patients undergoing elective surgical procedures in all the specialities available in the hospital, who were asked to provide blood for the procedure, were included in the study.

Study variables included: number of blood units requested, number of units transfused, pre/ post operative haemoglobin estimation. The data gathered was subjected to analysis and

the cross- match: transfusion ratio (CTr), transfusion index (TI), transfusion probability (TP%), degree of over or under transfusion determined from the patients' pre and post surgical haemoglobin levels were calculated.

RESULTS

Ninety-nine patients underwent elective surgical procedures such as mastectomy, prostatectomy, thyroidectomy, myomectomy caesarean section etc. Of these thirty-five were male representing 35.7% while 64.3% were female. For these procedures one hundred and thirty –three (133) units of whole blood were cross-matched and brought in the theatre but only forty-seven units were transfused.

During general assessment of blood utilization, the cross-match to transfusion ratio was 2.83. Transfusion probability was 42% while transfusion index was 0.62%. Among these patients, 63.3% did not have their post operative haemoglobin evaluated as requested. Of the others, 26.6% had lower post-operative haemoglobin when compared with their pre-surgical haemoglobin level while 7.1% had a higher post surgical haemoglobin level. In one percent of the cases both pre-and post operative haemoglobin was similar, while the calculation was not possible in 2% of patients because these ones did not have their pre-operative haemoglobin estimation records.

Thirty-two point seven (32.7) of the patients were transfused while 67.3% were not transfused. In the transfused group, 62.5% of patients did not have their post surgical haemoglobin estimation performed while 25% were under-transfused and 12.5% were over-transfused. In the non-transfused group, majority 63.7% still did not have their post-operative haemoglobin evaluated, while 28.8% had lower post surgical haemoglobin levels, 4.5% had a higher value and 1.5% had similar values.

Analysis of blood utilization for specific surgeries gave the following results. Procedures which indicated significant blood utilization were as follows: open prostatectomy CTr 2.4, TP% 60, TI 1; myomectomy CTr 1.5, TP% 67, TI 1.33; mastectomy CTr 1.8, TP% 60, TI 1; nephrectomy CTr 2, TP% 100, TI 1; laminectomy CTr 2, TP%100, T1 1; lobectomy CTr 1, TP%100, TI 2; aneurysm CTr 1, TP% 100. TI 3; sequestrectomy CTr 2, TP% 100, TI 0.67; femoral fracture CTr 4, TP% 50, TI 0.5.

Major sources of blood waste include: elective caesarean section CTr 22, TP% 6.25, TI 0.0625; skull fracture/ hydrocephalus CTr 5, TP% 33, TI 0.33; total abdominal hysterectomy CTr 5, TP% 33 TI 0.33; cholecystectomy, split skin grafting, mesh repair, urethroplasty, bilateral nasal polypectomy, parotidectomy and thyroidectomy CTr, TP%,TI = infinity,

Figure 1

Table 1:Sex

Table 1:Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	35	35.7	35.7	35.7
	female	63	64.3	64.3	100.0
	Total	98	100.0	100.0	

Figure 2

Table 2: Comparison of pre/post operative haemoglobin(Hb) levels

Comparison of pre/post operative haemoglobin(Hb) levels	
Title	Value %
Lower postoperative Hb	26.6
Higher postoperative Hb	7.1
Similar postoperative Hb	1
Postoperative Hb not done	63.3
No preoperative Hb	2

Figure 3

Table 3: Comparison of transfused (1) and non transfused (2) groups

Comparison of transfused (1) and non transfused (2) groups	
Criteria	Value %
Group 1	32.7
Under transfused	25
Hb not done	62.5
Over transfused	12.5
Group 2	67.3
Lower post op Hb	28.8
Hb not done	63.7
Same value	1.5
Higher post op Hb	4.5

DISCUSSION

During surgical procedures, there is a demand for whole blood or blood products. The demand for blood is usually based on subjective anticipated blood loss. A practice which involves routine pre-operative cross-matching of blood and its presence in the theatre before surgery begins means that blood is unavailable for others for 24-48 hours.[2] This increases the chances for outdating and ageing of blood.

However in developing nations such as Nigeria, palpable blood before induction of anaesthesia is a guarantee of safety

and a safeguard that blood will be available when needed. This is because of the fact that financial constraints and ignorance, may provoke some untruth about the availability of blood from patients' and or relatives (local experience). Sometimes the surgeon is party to this in a bid to perform the surgery and be free of bothering by the patients and well wishers.

Unfortunately, the blood provided may not be ultimately utilized causing a waste of patients' resources, technicians' time, holding up of blood bank reserves and ageing of blood.

The need to streamline blood ordering and transfusion practice was documented in a study in 1973, when Friedman et al showed over-ordering of blood similar to that in our study. Sarma recommended that if the number of units transfused per case is less than 0.5, the practice of type and screen should be upheld. [3, 4]

In a study in 1975, Boral Henry first suggested the use of the cross-match transfusion ratio.[5] A value of 2.5:1 or less indicates significant blood utilization. In the study, open prostatectomy, myomectomy, mastectomy, laminectomy, lobectomy, sequestrectomy fell into this category.

Chawla et al suggested a value between 2 and 2.5. They showed that with values greater than 2.5, less than 40% of blood provided was utilised.[6] In our study, elective caesarean section, thyroidectomy, total abdominal hysterectomy, cholecystectomy, Heller's procedure, split skin grafting, bilateral nasal polypectomy showed significant under utilization of the cross matched blood

Other indices used n the calculation of blood utilization include transfusion probability (TP%) which was suggested by Mead et al in 1970.[7] TP% = number of patients transfused divided by number of patients cross-matched multiplied by a 100. A value of 30% indicates significant blood usage. The general value of 42% obtained in the study suggests significant blood utilization but the value does change when the analysis is based on specific procedures. For example prostatectomy is 60%, myomectomy 67%, mastectomy 60%, aneurysm surgery 100% while caesarean section is 6.25%, thyroidectomy, cholecystectomy, Heller's procedure, parotidectomy, split skin graft, mandibular fracture reduction were less than 1%. Type and screen has been suggested if the incidence of transfusion is less than 10%.[8]

Transfusion index (TI) can also be employed. TI = number of units transfused divided by the number of patients cross-matched. A value of 0.5 indicates significant blood usage.[6] Again the open prostatectomy group fall in this category while the thyroidectomy group do not.

In order to calculate the maximum surgical blood ordering schedule (MSBOS), the Mead's criterion is used. MSBOS = 1.5 X Transfusion index.[7]

CONCLUSION

Blood over ordering does occur and needs to be minimized. In view of the risk of transmitting hepatitis, HIV, doctors need to change their blood request pattern and limit transfusion. The blood bank must be poised to meet the challenges of blood provision in the decade in order to promote the establishment of type and screen arrangement as well as a maximum surgical blood ordering schedule.

References

1. Vibhute M., Kamath S.K., Shetty A. Blood utilisation in elective general surgery cases: requirements, ordering and transfusion practice. J Postgrad Med 2000;46:13
2. Jayathi S., Ravishankar M., Bhutia S.G., Shrinivasan K., Ananthakrishnan N. Blood utilization in elective surgery, requirements, ordering and transfusion practice Natl Med J India 1997 Jul-Aug; 10(4):164-8
3. Friedman B.A., Oberman H.A., Chadwick A.R., Kingon K.I. The maximum surgical blood order schedule and surgical blood use in the United States. Transfusion 1976; 380-387
4. Sarma D.P. Use of blood in elective surgery JAMA 243: 1536: 1980
5. Friedman B.A., An analysis of surgical blood use in United States hospitals with application to the maximum surgical blood ordering schedule. Transfusion 1979 ;19:268
6. Chawla T., Kakepoto G.N. Khan M.A. An audit of blood cross-matching practice at the Aga Khan University Hospital: First step towards a maximum surgical blood ordering schedule. J Pakist Med Assoc 2001 Jul; 51(7): 251-4
7. Mead J.H., Anthony C.D., Sattler M. Hemotherapy in elective surgery: an incidence report, review of literature, and alternatives for guideline appraisal. Am J Clin Path 1980; 74: 223-227
8. Jayaranee S., Prathiba R., Vasanthi N., Lopez C.G. An analysis of blood utilisation for elective surgery in a tertiary medical centre in Malaysia Malaysia J Pathol 2002 Jun; 24(1):59-66

Author Information

Amucheazi A.O
Department Of Anaesthesia, University Of Nigeria Enugu Campus (Unec)

Ajuzieogu V.O
Department Of Anaesthesia, University Of Nigeria Enugu Campus (Unec)

Ewah R.L
Department Of Anaesthesia, University Of Nigeria Teaching Hospital Enugu