

THE MANAGEMENT OF TRANSFUSION SERVICES, ANALYSIS AND ASSESSMENT

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ABSTRACT

Introduction: The hospital blood bank (HBB) need to timely provide adequate amounts of blood and blood products for surgeries. For various surgical programs are performed assessments of the average number of blood doses needed for surgery. By using two types of requisitions BT/AB (blood type/antibody) and BT/AB/MT (blood type/antibody/match test) for pretransfusion immunohaematological testing in General Hospital "Prim. Dr. Abdulah Nakas" is achieved more rational consumption of blood and blood derivatives and financial savings through reduced number of matching tests (MT). **Goal:** To determine the total amount of pre-operative requisitions (BT/AB and BT/AB/MT) for blood and blood products at surgical departments of the General Hospital "Prim. Dr. Abdulah Nakas" in the period from June 1, 2014 – December 31, 2014 and analyze the consumption/return of blood in reserve in relation to the surgical disciplines, the total number of savings in MT. Conduct assessments MSBOS (Maximum Surgical Blood Ordering Schedule). **Results:** The total amount of preoperative requisitions for blood and blood products in surgical wards was 927 requests from which 623 demands or 67.2% is tested by BT/MT, while 304 or 32.8% was tested by BT/AB/MT. Transfused in total was 617 units of blood and blood products, 275 units were not transfused. Probability of transfusions for surgery was 51.3, the highest in the case of surgical intensive care 70.4 and the lowest for the department of general surgery 37.2%. Assessment of indicators of efficient resource management indicates they are the best at the delivery ward 0.89, while a total for surgical wards is 0.69. In total for surgery on the average were required 2.1 units of blood. By using two types of requisitions for pretransfusion immunohaematological testing (BT/AB and CG/AB/MT) is achieved more rational use of MT. In 623 requests for BT/AB only 61 MT were performed. Average of blood units issued in accordance with these requirements is 0.08 and the savings in the number of MT amounts to 562.

Key words: PBM, requisitions BT/AB and TG/AB/TPO, MSBOS.

1. INTRODUCTION

PBM (patient blood management) transfusion services, tends to reduce the need for blood transfusions (allogeneic), reducing healthcare costs and at the same time to provide blood for patients who really need it (1-4). These follow-up and use studies of blood for surgical programs, can help to eliminate the inappropriate use of blood and blood products, and lead to more efficient work, better assessment and better practices in the daily work of hospital blood banks (HBB) (2-5). Optimal use of available devices, equipment, funds, as quality control transfusion services, fewer complaints, incidents and unwanted consequences of transfusion (4, 5). Systemic, comprehensive control of transfusion treatment, "hemovigilance" effectively contributes to the realization of this concept and the reduction of the so-called clinical

risk associated with transfusion (5-8). Inappropriate use of blood has a direct impact on the health budget, additional tests, supplies and excessive use of blood can do more harm, rather than be of benefit to a patient (8-14). The potential revision in the number of transfusions for surgical programs is every day, estimates carried out are largely beneficial, primarily to determine how effectively the blood is used in elective surgery (8-14). Matching test, MT needs to be ordered according to the set standards of ordering for certain surgical procedures, and increase the number of requests test screening antibodies in serum (T&S) without cross test and if it is necessary to perform it and issue the dose in case of emergency and perform matching test later (14).

2. METHODOLOGY

This retrospective study determined the total number of BT/AB/MT and BT/AB requests for blood and blood products for surgical departments in General Hospital “Prim. Dr. Abdulah Nakas” in the period from June 1, 2014 until December 31, 2014. By descriptive scientific method, are collected, processed and analyzed data from conventional samples, then it was performed the final calculation and determination of statistical indicators. From data from requisition was used the following: a period from June 1, 2014 –December 31, 2014, requisitions for BT/AB/MT and BT/AB, the name of the surgical department, the number of planned blood units for surgery, the total number of tests, the number of matching tests performed (MT), number of transfusions (TR), the number of returned blood to the blood reserves. All data were entered in specially designed tables in Microsoft Excel, and then statistically processed in SPSS package. To estimate the number of units of blood for surgery through MSBOS, or rational use of human and material resources in the transfusion preparation of the planned operations are handled by different parameters such as: a) the likelihood of transfusion, b) the ratio between the number of units of blood tested for compatibility (MT) and transfused blood units (TR), c) transfusion indices (TR/MT).

2.1. Statistical analysis

Carried out is descriptive statistical analysis of the data in this study, which is composed of the collected data are entered into the table Microsoft Excel 2013 from requirements (paper documentation) for transfusions with surgical departments. The data were analyzed, calculated. After checking the integrity of the data, performed is the statistical analysis. The analysis was performed using the statistical package IBM SPSS Statistics 21.0 (Chicago, Illinois, USA). Data are presented in table form, by using the classical methods of descriptive statistics, and depending on the nature and scale of data.

3. RESULTS

In General Hospital “Prim. Dr. Abdulah Nakas” in the period from June 1, 2014 – December 31, 2014 in total from the surgical wards HBB received 927 requests for BT/AB and CG/AB/MT. Of that 623 or 67.2% of requests was for BT/AB and 304 or 32.8% for BT/AB/MT. From a total of 927 requests for BT/AB and CG/AB/MT for patients were conducted 892 matching tests (MT). In case of requests for BT/AB/MT, there was 831 MT tests performed

and for requests BT/AB–61 MT.

When we compare the average of the issued and returned blood and blood products according to the requirements, we note significant difference in terms of a large number of issued/TR and returned to the reserve, by regular method BT/AB/MT compared to BT/AB. In case of requests for BT/AB, transfused were 47 units and returned 14 units (61 MT). Average issued blood by BT/AB according to the total number of applications is 0.08, returned 0.003. In case of requests for BT/AB/MT, was done 831 MT, 570 units of blood and blood products are transfused, 261 units have been returned. Average unit issued by the application is 1.84, 0.89 returned.

BT/AB/MT & BT/AB		N MT	Mean Transf.	SD Transf.	Minimum Blood units	Maximum Blood units
Total issued t=62.407; p=0.001	BT/AB	47	0.0884	0.53859	0.00	8.00
	BT/AB/MT	570	1.8487	2.17474	0.00	15.00
	Total	617	0.6663	1.55820	0.00	15.00
Total (returned) t=44.638; p=0.0001	BT/AB	14	0.0032	0.08013	0.00	2.00
	BT/AB/MT	261	0.8980	0.95066	0.00	5.00
	Total	275	0.2967	0.69043	0.00	5.00

Table 1. Transfused blood on surgical wards and returned pre-ordered blood units (with performed MT) from the fridge of occupied blood in the fridge with a blood reserves

		Department						Total	
		Gyne- cology	Surgical ICU	General surgery	Ortho- pedics	Obste- trics	Urology		
(TR)	No	N	5	16	27	69	4	27	148
		%	41.7	29.6	62.8	51.5	33.3	55.1	48.7
	Yes	N	7	38	16	65	8	22	156
		%	58.3	70.4	37.2	48.5	66.7	44.9	51.3
Total re- quests	N	12	54	43	134	12	49	304	
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Table 2. Probability of transfusion

		Department						Total
		Gyne- cology	Surgical ICU	General surgery	Ortho- pedics	Obste- trics	Urology	
MT		66	196	107	329	49	145	892
TR		57	160	53	209	44	94	617
MT/TR		1.1	1.2	2.0	1.5	1.1	1.5	1.4

Table 3.

		Department						Total
		Gyne- cology	Surgical ICU	General surgery	Ortho- pedics	Obste- trics	Urology	
TR	N	57	160	53	209	44	94	617
MT	N	66	196	107	329	49	145	892
TR/MT		0.86	0.81	0.49	0.63	0.89	0.64	0.69

Table 4. Index of transfusion

		Department						Total
		Gyne- cology	Surgical ICU	General surgery	Ortho- pedics	Obste- trics	Urology	
MT	N	66	196	107	329	49	145	892
TR	N	57	160	53	209	44	94	617
MSBS		1.7	1.8	3.0	2.3	1.6	2.3	2.1

Table 5. Average of MT requests, units of blood for surgery. MSBOS = 1.5 x MT/TR

The likelihood of transfusion is 51.3. The highest is in the case of surgical intensive care 70.4, which spent the most of requested blood are lowest at the department of general surgery 37.2.

(MT/TD <2 is considered acceptable, MT/TR <1.5 is desirable, and MT/TR = 1 is ideal)

The ratio MT/TD on general surgery ward is <2 and is considered acceptable, <1.5 is desirable for surgical intensive care, orthopedics and urology, and the ideal for obstetrics and gynecology wards.

Transfusion Index TR/TR > 0.5 is an indicator of efficient resource management.

General surgery has a lower index of 0.4 and other surgical departments have index above 0.5. The best is at the obstetrics department 0.89, with the total for all surgical departments of 0.69.

Gynecology 1.7, maternity ward on average ordered 1.6 units of blood for surgery, surgical intensive 1.8, general surgery 3, orthopedics 2.3, urology 2.3 and on surgical ward is ordered on average of 2.1 units of blood.

4. DISCUSSION

Department of Transfusion Medicine (HBB) in this General hospital uses two types of requisitions for different blood testing, in terms of rationalization of reagents and consumable materials transfusion, which was confirmed with 623 (67.2%) requests for BT/AB testing, and 304 (32.8%) for BT/AB/MT testing. The largest number of applications for operational programs was at the gynecology 273 or 29.5%, followed by obstetrics department with 217 requests, or 23.4%, orthopedics 206 (22.2%), urology 119 (12.8%), surgical intensive care 57 (6.2%), general surgery 52 (5.6%). The lowest number of applications was at the ORL department 3 requirements or 0.3%. Total during surgeries was transfused 617 doses of blood/blood products, mostly at orthopedics department—209 doses, followed by surgical ICU 160, gynecology 57, general surgery 53 and the least at delivery wards 44 doses transfused. Total return doses after performed MT to blood reserve was 274, with significant statistical difference in the number of issued and returned blood products according to surgical departments ($p < 0.05$). When we compare the average of the issued and returned doses according to the requirements we notice significant difference in terms of increasing number of issued and returned after BT/AB/MT compared to BT/AB. Monitoring of practices in the application of the number of transfusions in dose/units are carried out continuously in hospital, clinical institutions in our country and in the world, for example in Missouri, following the application of transfusion in the first 24 hours after admission in patients with severe trauma. Then continue monitoring for 18 months in total quantities of issued doses/units of blood. They found that out of 2312 patients, 850 patients received transfusions of which 807 patients had head injuries and to them are transfused 5 doses or more than 5 doses (≥ 5) blood in intervals of 6 hours or more than 10 doses or 10 doses (≥ 10) in the course of 24 hours. Blood transfusions and blood products resulted in the positive rate of survival of these patients after 30 days, consider that the study should continue to include additional analysis of the optimal use of coefficients with certainly of positive outcome

of injured patients (14). By reducing unnecessary transfusions can be timely provided sufficient blood to patients in real need, especially this is important in patients with acute bleeding, patients who have life-threatening condition because of bleeding (14-17). By establishing a quality management system reduces the number of adverse events in the transfusion chain (17). Improving the quality, safety, efficiency and effectiveness of health care, the mission of a number of international organizations for health care, such as the Agency for Healthcare Research and Quality's (AHRQ) in the US, the UK National Health Service in the UK, Canadian Patient Safety Institute (CPSI) in Canada, members of the European Blood Alliance and others (18,19). The working group of the International Federation of Gynecology and Obstetrics proposed classification system, standardized terminology for the etiology of symptoms of abnormal uterine bleeding, which was approved by the International Federation of Gynecology and Obstetrics. The Executive Committee is supported by the American College of Obstetricians and Gynecologists (20). For many operations, such as hysteroscopy, polypectomy or myomectomy, the blood is not claimed for operational programs or may require transfusion only if suspected of structural abnormalities that may be the cause of acute, sudden bleeding (20,21). Final reports on gynecological bleeding show that these operational procedures can be successfully controlled without the use of blood, and to women, especially of childbearing age to avoid transfusions due to known risk of transfusion with more possible sensitization to blood antigens. Sensitization to blood antigens, particularly affect the pregnancy with all the other possible early and late risks associated with transfusions. Therefore, in younger women recommended to resort mainly to other alternative methods to stop bleeding (21). Excess blood ordering is common practice for many operations (22) Many risk factors exist for these estimates, but they are determined to be useful in predicting the rational number of blood transfusion of red cells to be calculated, including patient-specific factors, such as before and postoperative hemoglobin levels and amounts of blood loss during surgery (24). Preoperative evaluation of requests for blood over the assumption, which results in significant problems in the management of the blood, leading to the possibility of hoarding, thus increasing the number of old blood units and a blood waste, additional search cross-tests, needs all the greater availability of certain blood types or phenotypes, resulting in large overall costs in HBB (22-24). In Emerg Trauma Shock hospital in India following the practice in the past six months, the results are: 252 operations in 1088 made cross-probe and only 432 units were transfused (24). Were revised and were calculated new estimates of the necessary amount of blood in units/dose. For surgical trauma used more than 2 units of blood after surgery. Calculated total required units of blood in 0.5 to 4, pre-dose blood taking 11 to a neurosurgical operation is reduced to 1 dose (24). These recommendations are offered for 63 surgical procedures (e.g. in case of hysterectomy, transurethral resection of the prostate and cesarean delivery, etc.) (24). Large ordering of blood should be minimized by changing the ordering of blood through the form of maximum surgical blood ordering (23-26,27). Proper placement

of requests for blood, according to the designed schedule is intended with capricious ordering blood MSBOS used to promote the automatic limiting the application of the blood, and thus leads to an increase in the effective ordering of blood. This requires simplification schedule preparing blood for surgery in view of the blood supply in HBB, resources, staff time, saving reagents, better practices, better coverage of surgical patients (22-25). MSBOS for the planned surgeries, enables more efficient management of available reserves of blood by the oldest composition of blood, the first issue to use for waste reduction levels, then reduce the number of unnecessary lab testing, reducing the overall cost of the health institution (due to more efficient use of human and material resources in blood transfusion service) and all without compromising patient safety. MSBOS has long been applied in all developed countries in the world (24-26,27). The use of blood for surgical programs supplemented and/or corrected in accordance with their own experience/practice of using blood preparations (25).

5. DISCUSSION AND CONCLUSION

The total number of preoperative requirements for blood and blood products in surgical departments of General Hospital "Prim. Dr. Abdullah Nakas" from June 1, 2014 – December 31, 2014 amounted to 927 requests: 623 claims or 67.2% for BT/AB testing and 304 or 32.8% for BT/AB/MT testing. Transfused 617 units of blood and blood products, 275 units/doses were returned from the fridge for reserved blood in the fridge with a blood reserves.

Probability of transfusions for surgery was 51.3, the highest in the case of surgical intensive care 70.4 and the lowest for the department of general surgery 37.2%. Transfusion Index TR/MT at general surgery was the lowest 0.4 which shows that out of 107 performed MT only 53 doses were used, and the best is at the obstetrics department 0.89 where it was performed 49 MT of which 44 are TR. During this period, on average gynecology department ordered 1.7 units of blood for surgery, obstetrics 1.6, surgical intensive 1.8, general surgery 3, orthopedics 2.3, urology 2.3, with a total average for surgical department of 2.1 units of blood ordered for surgical programs. Total for surgical departments transfusion index is 0.69, (TR/TR > 0.5) which is an indicator of efficient resource management.

Application of two types of requisitions for immuno-haematological tests before surgery achieved more rational consumption of blood, especially the application of BT/AB in which is performed 61 MT. Average blood issued in accordance with these requirements is 0.08 and the savings in the number of tests amounted to 562.

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