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Indicators and Effects of Blood Transfusion in Surgically Treated Urology Patients

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Abstract

Objective: To establish the determining factors for blood transfusion and its effects in urological surgery.

Design: A five years' hospital based descriptive, retrospective, cohort study.

Setting: The surgical wards of Moi Teaching and Referral Hospital (MTRH), a 750 bed tertiary centre in the Western region of Kenya.

Subjects: Sixty patients in a 420 cohort that underwent various types of surgery for urological problems.

Materials and Methods: Patients who underwent surgery for urological problems were identified from the theatre registry. The files were retrieved from the records department and those complete for the sought data had the information extracted in line with a data sheet designed in keeping with the outlined objectives.

The gathered data was confirmed for completeness, coded and then entered into a computer using SPSS software version 17.0 that was used for analysis. The data was analysed for descriptive statistics of central tendency, distribution, odds ratios, relative risks and correlation. Inferential statistics assumed a 95% confidence interval with an alpha value of 0.05 and so was taken to be statistically significant at p value ≤ 0.05.

Main outcome measures: The primary outcome measures were the determinants of blood transfusion. The secondary outcome measures were the effects of blood transfusion on morbidity and mortality. Morbidity was represented by postoperative complications and length of hospital stay.

Results: There was a 14.3% rate of blood transfusion with a male to female ratio of 7.6:1. The amount of blood transfused ranged from one to nine whole blood units with a mean and mode of 2.3 and 2 units respectively. Age of transfused patients ranged from 12 years to 86 years with mean ± standard deviation of 61.2 ± 17.5 years. The need for blood transfusion depended on age, type of surgery, type of anaesthesia used and the duration of surgery. Transfused patients had longer hospital stay, more postoperative complications and greater mortality rate than those not transfused.

Conclusion: The principal indicators of need for blood transfusion in urological surgery are existence of co morbid conditions, the type of surgery done, the type of anaesthesia administered and the duration of surgery. Blood transfusion in surgically treated urology patients negatively impacts on the morbidity and mortality with increase in the length of hospital stay, postoperative complications and mortality rate.

Introduction

Blood transfusion is resorted to in attempts to correct severe anaemia likely to endanger lives. It comes with inherent challenges that make it necessary to only use it where other resuscitative measures would not yield the desired outcome [1-4]. Apart from the fact that there are very few studies on blood use in urological surgery, we realized that our hospital, like a number of others in the world [5,6] has no transfusion protocol. We present our findings on the principal indicators and the effects of blood transfusion in surgically treated urology patients in a tertiary centre in the Western part of Kenya in the understanding that these will not only fill the void in this area of study but also constitute a basis for protocols on transfusion in hospitals.

Materials and Methods

Patients who underwent surgery for urological problems were identified from the theatre registry. The files were retrieved from the records department and those complete for the sought data had the information extracted in line with a data sheet designed in keeping with the outlined objectives.

The gathered data was confirmed for completeness, coded and then entered into a computer using SPSS software version 17.0 that was used for analysis. The data was analysed for descriptive statistics of central tendency, distribution, odds ratios, relative risks and correlation. Inferential statistics assumed a 95% confidence interval with an alpha value of 0.05 and so was taken to be statistically significant at p value ≤ 0.05.

The primary outcome measures were the determinants of blood transfusion. The secondary outcome measures were the effects of blood transfusion on morbidity and mortality. Morbidity was represented by postoperative complications and length of hospital stay.

Results

Sixty out of 420 patients had blood transfusion, giving a transfusion

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rate of 14.3%. The male to female ratio of those transfused was 7.6:1 but gender had no significant role in determining the need for transfusion (p=0.117). The age ranged from 12 years to 86 years with a mean ± Standard Deviation of 61.2 ± 17.5 years.

The amount of blood transfused ranged from one to nine whole blood units with a mean and mode of 2.3 and 2 units respectively. As seen in table 1, 71.7% of the patients got either one or two whole blood units with the majority of the patients getting 2 units.

There were strong positive correlations between the need to transfuse and the age of the patient, the type of surgery done and the duration of surgery (all $p < 0.001$). Three quarters of the transfusions were in patients older than 50 years. The most frequently transfused age was 70 years and a sixth of those transfused were older than 75 years of age. Forty-three point three percent of the transfusions were in patients who underwent surgery for prostate disease while the rate of transfusion rose steadily after the second hour of surgery to 83% for those whose surgery lasted more than four hours as seen in Table 2.

Four variables were found to determine the need for blood transfusion on univariate analysis. These were presence of co morbidity (p=0.022), the type of surgery done (p=0.002), the type of anaesthesia (p=0.027) and the duration of surgery (p=0.015). The rate of transfusion in those with co morbidity was 1.8 times that of those without associated diseases with an odds ratio of 2 and relative risk of 17. Spinal anaesthesia was less likely to lead to blood transfusion as compared to general anaesthesia. None of these variables were significantly predictive of the need for transfusion on multivariate analysis.

Blood transfusion was positively correlated with the length of hospital stay (p=0.001). The proportion of patients who had been transfused rose exponentially to be 8 times as often in those staying longer than 4 weeks as compared to those staying less than a week. This is depicted in Table 3.

Patients who had been transfused had a higher rate of postoperative complications with an odds ratio of 1.7 and a relative risk of 1.6. The mortality rate in the transfused group was 4 times that of those who did not get blood transfusion as seen in Table 4.

NUMBER OF UNITS	Frequency	Percent
1	21	35.0
2	22	36.7
3	9	15.0
4	2	3.3
5	2	3.3
6	1	1.7
7	1	1.7
8	1	1.7
9	1	1.7
Total	60	100.0

Table 1: Number of whole blood units transfused.

TRANSFUSED	OPERATION TIME IN HOURS					
	<1 hour	1-2 hours	2.1-3 hours	3.1-4 hours	> 4 hours	Total
yes	10	24	17	4	5	60
no	97	177	62	23	1	360
Total	107	201	79	27	6	420

Table 2: operation time and need for blood transfusion.

TRANSFUSED	LENGTH OF STAY IN WEEKS					
	< 1 week	1-2 weeks	2.1-4 weeks	> 4 weeks	> 4 hours	Total
yes	10	24	17	9	60	60
no	171	129	36	24	360	360
Total	181	153	53	33	420	420

Table 3: Transfusion and length of stay in the hospital.

Discussion

Blood transfusion is aimed at saving lives but also comes with challenges ranging from blood borne diseases, ABO incompatibility and post-transfusion complications like Systemic Inflammatory Response Syndrome (SIRS) and Multiple Organs Failure (MOF) [1-4]. Its use should therefore be based on scientific evidence for need while keeping in mind the likely unwelcome effects of this procedure.

We found key indicators of need for blood transfusion that can be relied on in the formulation of a protocol in our hospital. This can help us move from the category of improper or inefficient use of blood in which many health institutions in both developed and developing world's are [5,6].

The finding that blood transfusion is predicated on age and the type of surgery done is in line with similar findings by Ngugi and Saula [7] as well as Ayantude and colleagues [8]. While the latter study found postoperative complications to be an indicator, our study and others reviewed did not have this as an independent indicator. One would imagine that for it to qualify, the complications would have to be either causing blood loss or diminishing its production and this can also explain the basis for co morbidity in our study being an indicator of transfusion. We, however, did not find any significant correlation between co morbidity and postoperative complications in our study probably because we had a different type of surgery.

Regional anaesthesia has been found in other studies [7,9] just like in ours, to have lower chances of requiring transfusion when compared to general anaesthesia. One way of looking at this is the fact that general anaesthesia will mostly be used for bigger and more complex surgeries that may lead to greater blood loss. Coupled with our finding that the duration of surgery is an indicator of the need to transfuse, the type of anaesthesia can be seen as a surrogate of the type and duration of surgical intervention.

Related studies did not look into the outcome of blood transfusion with regard to morbidity and mortality principally because those found only looked at indicators of transfusion. However, non urological studies that looked at these variables came up with findings similar to ours. Sakr and colleagues found that transfused patients had higher ICU and hospital mortality rates as well as increased morbidity [10] while Pedersen et al found increased odds of death and pneumonia in those transfused. These findings are the same as our establishing in this study that the transfused patients had longer hospital stay, more postoperative complications and a higher mortality rate.

Conclusion

The principal indicators of need for blood transfusion in urological

TRANSFUSED	outcome of treatment		Total
	alive	died	
yes	58	2	60
no	357	3	360
Total	415	5	420

Table 4: blood transfusion and outcome of treatment.

surgery are existence of co morbid conditions, the type of surgery done, the type of anaesthesia administered and the duration of surgery. Blood transfusion in surgically treated urology patients negatively impacts on the morbidity and mortality with increase in the length of hospital stay, postoperative complications and mortality rate.

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