Red Cell Use In Elderly Patients: A Review Of South Australian Public Hospitals

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Background and Objectives:

As a consequence of an ageing population and advances in medical care, demand for red cells is expected to grow against a decreasing red cell donor pool. Population-based red cell utilisation studies have reported high rates of red cell transfusion in elderly patients. The aim of this study was to evaluate patient characteristics and blood usage in elderly patients ≥ 65 years of age within South Australian public hospitals.

Methods

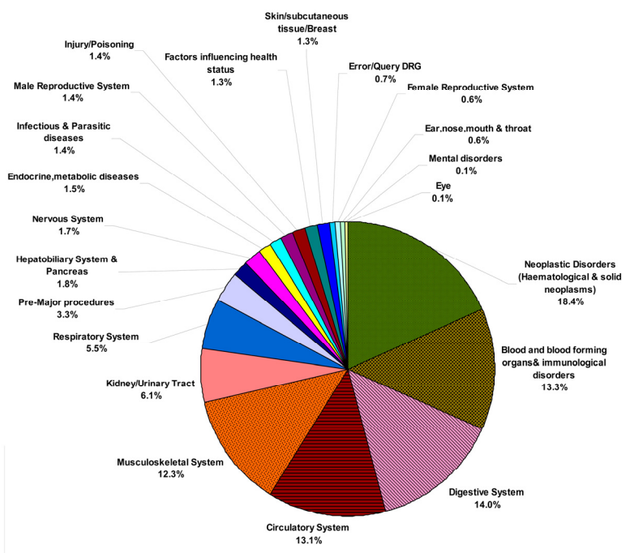
A linked electronic database was developed using clinical, epidemiological and transfusion data. The database was limited to inpatient episodes involving patients ≥ 65 years of age. Electronic data files provided information on clinical variables such as surgical and medical procedures according to the International Classification of Diseases (ICD-10-AM codes), including speciality related groups (SRGs), diagnosis related groups (DRGs) and major diagnostic categories (MDCs); as well as demographic variables such as age, gender and red cell transfusion data.

Only homologous units were included. Data analysis included aggregation of red cell usage by ICD-10-AM codes, DRGs, SRGs, patient demographics, type of admission and red cell use.

Results

Of the 360,550 admissions recorded across a period of three financial years, 24,586 admissions (6.8%) received a total of 71,413 red cell units with an overall average of 2.9 units. The results in Table 1 show blood use as categorised by gender, age, admission type and medical/ surgical specialities. Emergency admissions and inpatient/overnight admissions were the most common admission types associated with high blood usage. Overall blood usage was slightly greater in males than in females and in patients in the age group of 75 to 84 years. Major diagnoses related to the treatment of haematological disorders & malignancies, digestive, circulatory and musculoskeletal disorders represented the most significant clinical entities, accounting for 70% of all red cells transfused (Figure 1).

Figure 1. Blood Usage by Major Diagnostic Category



DRGs including tracheostomy, lymphoma and non-acute leukaemia, red blood cell disorders, gastroscopy, hip replacements and major small and large bowel procedures were amongst the top 20 DRGs, utilising 49% of total red cells (Table 2). As DRGs associated with tracheostomy, haematological disorders and malignancies include many different diseases, the principal diagnosis was used to identify these groups. Principal diagnoses associated with iron deficiency anaemia, myelodysplastic syndromes, multiple myeloma and acute myeloid leukaemia in the haematology patient group utilised 4.5%, 5.8%, 2.1% and 3% respectively of the total red cells transfused.

Principal diagnoses related to aortic aneurysm and dissection, acute myocardial infarction, sepsis, chronic ischaemic heart disease and malignant neoplasm of colon requiring an intensive care unit (ICU) stay were some of the most common indications of transfusion associated with tracheostomy.

Table 1. Summary of demographic and admission characteristics and red cell use

Patient Category	Admissions	Admissions with transfusion	% of admissions with transfusion	% of total red cells transfused	Average units / transfused admission
Gender					
Male	187,435	12,754	6.8	55	3.1
Female	173,095	11,832	6.8	45	2.7
Age Groups					
65-74	146,901	8,169	5.6	35	3.0
75-84	154,478	10,819	7.0	44	2.9
≥85	59,151	5,598	9.5	21	2.7
Admission type					
Elective	117,124	7,413	6.3	28	2.7
Emergency	152,458	14,646	9.6	62	3.1
Admission category					
Overnight	191,975	19,148	10.0	84	3.1
Same day	168,555	5,438	3.2	16	2.2

Table 2. Summary of admissions and transfusion details by DRGs

SRG	Diagnosis Related Group (Top 20 by Volume)	Admissions	Admissions with transfusion	% of admits with transfusion	% of total red cell transfused	Avg units transfused/ transfused admission
HAEMATOLOGY	Q61A-RED BLOOD CELL DISORDERS + CCC	1139	875	77	3.5	2.9
	Q61B-RED BLOOD CELL DISORDERS - CCC	4612	1911	42	6.6	2.4
	R60 B-ACUTE LEUKAEMIA – CCC	716	445	62	1.5	2.5
	R61A-LYMPHOMA &NON-ACUTE LEUKAEMIA+CCC	324	217	67	1.1	3.5
	R61B- LYMPHOMA &NON-ACUTE LEUKAEMIA-CCC	1330	596	45	2.4	2.8
	R61C- LYMPHOMA/NON-ACUTE LEUKAEMIA,SAMEDAY	4891	2949	60	9.2	2.2
ORTHOPAEDICS	I03A-HIP REPLACEMENT + CCC	624	298	48	1.2	2.9
	I03B-HIP REPLACEMENT – CCC	1878	513	27	1.6	1.9
	I08A-OTHER HIP & FEMUR PROC +CCC	780	503	65	2.1	2.9
	I08B-OTHER HIP & FEMUR PROC –CCC	1108	419	38	1.4	2.4
GIT ENDOSCOPY	G46A-COMPLEX GASTROSCOPY+CCC	272	174	64	1.0	4.2
	G46B-COMPLEX GASTROSCOPY-CCC	1209	419	35	2.0	3.5
	G47B-OTH GASTROSCOPY -CCC	1497	403	27	1.7	3.0
CARDIO-THORACIC SURGERY	F04A-CARDIAC VALVE +CPB-INVASIVE INVESTIGATION+CCC	271	213	79	1.1	3.8
	F06A-CABG+INVASIVE INVESTIGATION+REOPERATION/CCC	511	328	64	1.5	3.2
	F08A-MAJOR RECONSTRCUCTIVE VASCULAR PROCS-CPB+CCC	376	257	68	1.9	5.4
TRACHEOSTOMY	A06A-TRACHEOSTOMY WITH VENTILATION>95 HRS +CCC	258	212	82	2.9	9.9
	A06B-TRACHEOSTOMY &VENTILATION>95 HRS-CCC OR TRACHEOSTOMY/VENTILATION+CCC	773	533	69	5.0	6.8
COLORECTAL	G02A-MAJOR SMALL & LARGE BOWEL PROC+CCC	777	361	47	1.8	3.6
RESP	E62A-RESPIRATORY INFECTION/INFLAMMATION +CCC	2720	311	11	1.0	2.4

SRG Speciality Related Group
CCC Catastrophic comorbidity codes
PROC Procedures
CPB- Cardiopulmonary Bypass

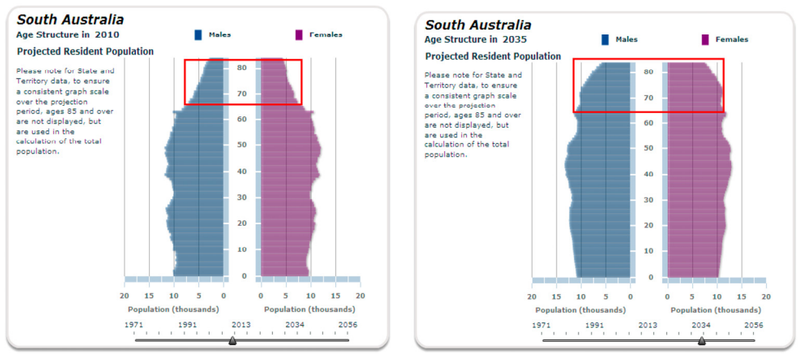
Discussion

This hospital-based study highlights red cell utilisation in a cohort of elderly patients. High red cell utilisation was common among elderly male patients with both emergency admission and inpatient/overnight admission. Increased blood usage was also associated with medical disorders and diseases, confirming a trend towards the increasing use of red cells in medical diagnoses.

The study also confirmed the high utilisation of blood for haematology disorders & malignancies, diseases of the digestive and circulatory systems as described in previous studies [1-3]. A significant percentage of the total red cell units transfused were given to elderly patients with iron deficiency anaemia (4.5%). According to the Australian Bureau of Statistics Population Estimates, between June 1989 and June 2009, the proportion of people aged 65 years and over in Australia rose from 11% to 13.3%. That number is estimated to double from 2010 to 2035 (an increase of 94.1%) to represent 17.9% of the overall population in 2035 (Figure 2).

The ageing of our population is also likely to result in an increase in some specific surgeries such as hip replacements and cardiac surgeries. According to information from the Australian Institute of Health and Welfare (AIHW), there was a 17% increase in separations associated with hip replacements and revisions performed in patients over 65 years of age within Australian hospitals between 2001/02 and 2007/08 [Australian Hospital Statistics 2007-2008, www.aihw.gov.au].

Figure 2. Population estimates for South Australia



Source- www.abs.gov.au

An escalating number of hospital separations for some surgeries and neoplastic disorders, combined with a concomitant rise in the ageing population, suggest the likelihood of a significant rise in demand for red cells in the future. Faced with this predicament, it is imperative that hospitals embark upon initiatives designed to reduce blood use in these areas. Traditionally, audits have been directed at the surgical specialities such as orthopaedic, cardiothoracic and colorectal surgery, which are high users of blood. Some variability exists in transfusion practices within specific surgical procedures and in different clinical settings, giving rise to potential opportunities for change. Initiatives such as blood management programs which include 'the three pillars' - measures to optimise the patient's red cell mass, minimise blood loss and heighten tolerance to anaemia [4] - may play a key role in limiting blood use in this population. While traditionally considered within the surgical paradigm, patient blood management also has relevance in reducing transfusion in medical patients with anaemia by utilising targeted therapies such as iron and erythropoietin.

The high use of blood in haematological disorders and malignancies and in patients with gastro-intestinal (GI) haemorrhage points to the need for transfusion practice initiatives in these areas. Additional audits and studies are required, both to fully evaluate current transfusion practice in these diagnostic categories and to identify potential for change.

References

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