Optimum Hemoglobin Level For Day Care Surgery In Children

Muhammad Afzal Mirza,[1] Muhammad Bilal Mirza,[2]* Mohsin Riaz Askari, [3] Muhammad Ismail,[1] Sadaqat Ali,[1] Sarfraz Ahmad[1]

ABSTRACT

Objective *To find the optimum hemoglobin (Hb) level safe for day care surgeries in children.*

Study design *Retrospective review of records.*

Place & Duration of study *The Children's Hospital and the Institute of Child Health Faisalabad, and Sargodha Medical College Sargodha, from January 2017 to June 2017.*

Methodology *The medical records of all the day care surgeries performed were reviewed for types of day care surgeries performed, preoperative hemoglobin level of the patients, and anesthesia related outcomes. Patients were divided in groups based on hemoglobin level. Variables were compared using SPSS version 16.*

Results *A total of 642 patients were operated as day care cases. It included 447 males and 195 females. Commonly performed surgeries were for Inguinal hernia, umbilical hernia, undescended testes, hydrocele, circumcision, hypospadias, abscesses, rectal polyp, prolapse etc. There were 42 patients In group 1 with Hb 7-8 gm%, in group 2 (Hb 8-9 gm%) 185 patients, in group 3 (Hb 9-10 gm%) 254 patients, in group 4 (Hb 10-11 gm%) 77 patients, and in group 5 (Hb>11 gm%) 84 patients. There were only three events of saturation drop to less than 80% which settled with endotracheal tube readjustment (2 in group 3, and 1 in group 4). Recovery was delayed in10 patients (1 patient in group 1, 1 patient in group 2, 4 patients in group 3, 2 patients in group 4, 2 patients in group 5) but remained uneventful. No statistical difference in recovery from anesthesia was noted in different groups hemoglobin levels.*

Conclusion *Day care surgery can safely be performed with hemoglobin level over 8 g/dl.*

Key words *Day care surgery; Hemoglobin level; Anesthesia.*

INTRODUCTION:

Day care surgery in children has several advantages over inpatient surgery in terms of being cost effective thus less financial burden on health care system, short hospital stay, convenient to family, and economy in use of health care services. The percentage of day care surgery is on the rise. In USA it is estimated that over 80% of surgical procedures are performed as day care surgery.[1]

Considering increasing trend in day care surgery in children there is a need to establish evidence based guidelines. In this regard the optimum level of preoperative hemoglobin for day care surgery remained unsettled. No clear evidence based guidelines are available in this regard. [2] Local guidelines are found in literature that cannot be generalized. Some anesthetists allow day care surgeries at Hb >8g/dl while other recommend Hb

[1] Department of Pediatric Surgery, The Children's Hospital and the Institute of Child Health, Lahore.

[2] Department of Pediatric Surgery, The Children's Hospital and the Institute of Child Health, Faisalabad

[3] Department of Anesthesia, The Children's Hospital and the Institute of Child Health, Faisalabad.

Correspondence:
Dr. M. Bilal Mirza [2]*
Department of Pediatric Surgery,
The Children's Hospital and the Institute of Child Health, Lahore
Email: blmirza@yahoo.com

>10 g/dl as an optimal value. Some studies put emphasis on clinical examination rather than recommending preoperative laboratory testing. [3,4]

Most (about 60%) of the Pakistani are anemic and hemoglobin levels below 6gm/dl are not uncommon.[5] Preoperative pack cell transfusion to optimize hemoglobin level has its own demerits and not desirable for day care surgeries. With this background, finding the evidence based preoperative safe hemoglobin level is even more important for day care surgeries. This study was conducted to address this issue.

METHODOLOGY:

This retrospective review of patients' admission charts admitted from January 2017 to June 2017 as day care cases, was conducted at the Department of Pediatric Surgery, The Children's Hospital & the Institute of Child Health Faisalabad and the Department of Pediatric Surgery, Sargodha Medical College Sargodha.

The medical record was reviewed for type of day care surgery performed, preoperative hemoglobin level, peroperative health related issues, and anesthesia related outcomes (uneventful recovery, delayed but uneventful recovery, delayed recovery including postoperative use of supplemental oxygen, blood transfusion, neurological insult, postoperative mechanical ventilation and mortality). Patients were categorized based on their hemoglobin level as; Group 1: Hb 7-8 g/dl; Group 2: Hb 8-9 g/dl; Group 3: Hb 9-10 g/dl; Group 4: Hb 10-11 g/dl; and Group 5: Hb >11 g/dl. The data was collected on a form and analyzed through SPSS V16. The outcomes of interest were compared through Chi-square test. A p value <0.05 was considered significant.

RESULTS:

There were a total of 642 patients who underwent day care surgery. It included 447 males and 195 females with male to female ratio of 2.3:1. Mean age of patients was 5.1 ±3.6 year; minimum 2 months and maximum 15 year. Mean weight of the patients was 18.5±7.4 kg; minimum 4Kg and maximum 40Kg. The type of day care surgeries performed in this series is given in table I. Mean hemoglobin level was 9.5 ±1.2 g/dl. Out of 642 patients, group1 had 42 (6.5%) patients, group 2, 185 (28.8%) patients, group 3, 254 (39.5%) patients, group 4, 77 (12%) patients, and group 5, 84 (13%) patients.

Intraoperatively there was drop of oxygen saturation to less than 80%, in two patients in group 3 and one patient in group 4 but the saturation returned to normal after ETT readjustment. Postoperative recovery was uneventful in 632 patients. Chi-square test was applied on collected data and p value was found to be 0.672, which was not significant.

DISCUSSION:

Daycare surgeries in children have become a standard of care in a variety of surgical conditions. No consensus has been found on optimum hemoglobin level that is considered safe for day care surgery. [2,6] Mild or moderate anemia may not have any detrimental effect on outcome of day care surgery. A marginally low hemoglobin level may not be detected clinically. When little than lower limit of hemoglobin is detected on laboratory tests it does not affect the outcome of day care surgery.[7] The minimum safe level of hemoglobin level in day care surgery is not known. There is no published data indicating that in mild anemia day care surgeries cannot be performed.

Table I: Type of Day Care Surgery

Type of surgical condition	Frequency (n, %)	Type of surgical condition	Frequency (n, %)
Inguinal hernia	220 (34%)	Branchial sinus/fistula/cyst	4 (0.6%)
Umbilical hernia	18 (2.8%)	Thyroglossal cyst/fistula	5 (0.77%)
Undescended testes	32 (5%)	Perianal sinus	4 (0.6%)
Rectal polyp	40 (6.2%)	Lymphadenopathy	16 (2.5%)
Rectal prolapse	23 (3.6%)	Hydrocele	42 (6.4%)
Circumcision	23 (3.6%)	Post burn contractures	7 (1.1%)
Abscess	41 (6.2%)	Hemangioma/lipoma	22 (3.5%)
Dermoid cyst	12 (1.87%)	Cleft lip	8 (1.2%)
Retention cyst	16 (2.5%)	Tongue tie	39 (6%)
Hypospadias	19 (3%)	Polydactyly	9 (1.4%)
Preauricular sinus	3 (0.5%)	Others	39 (6%)

There has been a gradual increase in number of day care surgeries in our hospitals. There has been disagreement among various anesthetists about the optimum hemoglobin level for day care surgery not only in our units but also in many other medical centers. In some studies preoperative testing of hemoglobin for minor surgeries is not recommended in children who are clinically normal on examination.[3,7,8] Various interesting contrasting features, as to hemoglobin levels, were noted between in various studies and same were observed in our study.

The mean hemoglobin level in these studies ranged from 10.2 to 12.99 g/dl while that of our series was 9.5g/dl indicating frequency of anemia in children at our facility. In other studies, 0.62% to 4% of patients had hemoglobin less than 10g/dl whereas in our study, 74.9% patients had hemoglobin less than 10g/dl which is a quite different. This highlights the importance of adopting a different strategy for their management. In our study day care surgeries were performed safely even with hemoglobin as low as 7g/dl without any complications. This may be an evidence in favor of accepting low hemoglobin level for surgery.

In various anesthesia guidelines preoperative testing for hemoglobin in case of ambulatory or day care surgery is not recommended. These guidelines did not bring change in decision making regarding day care or minor surgeries as many anesthetists still follow old practices.[9] Our study, however, did not look at hemoglobin levels of all the patients presented for day care surgery. It is not possible to comment on frequency of patients sent to pediatric OPD for evaluation and management of anemia as hemoglobin level below 6g/dl is not uncommon in our population. Moreover, hemoglobin less than 6g/dl is considered a valid trigger for transfusion in presence of symptoms of anemia.[10,11] Preoperative testing for hemoglobin in our population, with a great burden of anemia, seems appropriate.

The spectrum of anomalies dealt in our study as day care surgery was quite wide. Inguinal hernia and hydrocele were the most common conditions. All the patients were of ASA class I or II as per classification of American Society of Anesthesiologists. In our study, about 75% of patients were operated with hemoglobin less than 10g/dl. About 35% patients were operated with hemoglobin less than 8g/dl. None of these patients experienced any serious peroperative or postoperative events. In few patients slight delayed recovery was noted in different groups but it was statistically insignificant. There was no mortality in our series.

CONCLUSION:

No anesthesia related significant problems were encountered at hemoglobin level as low as 7 g/dl for day care surgery.

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Author's Contributions:
Muhammad Afzal Mirza: Main researcher, conceived idea, data collection, data analysis, intrepretation, literature research and final approval of manuscript.
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Mohsin Riaz Askari: Dtat collection and data analysis.
Muhammad Ismail: Data collection.
Sadaqat Ali: Data collection.
Sarfraz Ahmad: Data collection.

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