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Audit of emergent and urgent surgery for acutely ill pediatric patients: is access timely?

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ABSTRACT

There is a paucity of literature about wait times for urgent/emergent surgeries in Canada. Delays and performance of non-emergent operations overnight increase morbidity and mortality. The study aim was to determine patterns of delays and performance of less-emergent surgery overnight.

Methods: A retrospective analysis (June 2011–December 2013) of emergent/urgent surgeries was conducted using the ORSOS database (prospective patient and operative data). Surgeries were classified: class 1, 2 A, 2B, and 3: target times of 1, 6, 24 and 72 h. In hours (IH) = 7:45 AM–3:30 PM, M-F; others were out of hours (OOH) and overnight = 2300–0700.

Results: There were 4668 operations: class 1 (5.8%), 2 A (29.1%), 2B (42.1%), and 3(23%). For class 1, 2 A, 2B, and 3 surgeries, mean in-room times were 2, 4.7, 15.4, and 54 h respectively; 59.2% (class 1), 81.9% (class 2 A), 81.2% (class 2B) and 74.4%(class 3) were performed in target. OOH occurred for 73.2% (class 1), 71.5%(class 2 A), 54.7% (class 2B), and 27.7% (class 3). There were 37 class 2B and 3 surgeries overnight. There was a significant increase surgeries IH: 41.8% to 49.6%.

Conclusion: The majority of urgent/emergent surgery occurred OOH and the most unstable patients are least likely to have their operation within target.

Level of evidence: 4

Despite increased funding in Canada to improve surgical wait times, many patients continue to experience delays in excess of set targets [1]. As resources to address wait time delays have focused on improving operative access for elective conditions, concerns have arisen that more patients requiring urgent/emergent surgical care are experiencing significant delays, possibly increasing morbidity and mortality to this fragile group of patients [2]. There is a paucity of data on urgent/emergent surgery wait times, particularly in the pediatric population [3].

The Canadian Pediatric Surgical Wait Time Project (CPSWT) analyzed wait times for pediatric patients accessing both urgent and elective surgery in hospitals across Canada [4]. Over the duration of the CPSWT, approximately 1/3 of children had surgery past their targeted wait time [4]. Presently, there is no provincial or national policy on or reporting of surgical wait times for patients requiring surgery in less than 1 day.

While achieving timely surgical access is an important goal, ensuring optimal patient safety and outcome is paramount. In the UK, the National Confidential Enquiry into Peri-operative Deaths (NCEPOD) in 2003 found that out of hours operations were associated with increased patient complications [5]. There is a growing body evidence from human factors, aviation and medical literature which demonstrates that error is associated with increased fatigue [6–9]. As a result, the NCEPOD urges all surgeries (except those patients with life or limb-threatening conditions) not be performed between 0:00 and 7:59 [5,10]. Research from our institution found performing surgery out of hours was associated with increased major complications in radical nephrectomy for renal tumours [11] and increased esophageal leak after esophageal atresia and tracheoesophageal fistulae repairs [12].

For patients in our institution, urgent/emergent surgery access is achieved in one of three ways: performance out of hours, bump an elective surgery, or slate into "Open Access" time. The latter available Monday, Wednesday and Friday and to all specialties with prioritization based on medical urgency; bookings for these surgeries close 21 h in advance. With the perception of an increasing institutional awareness of both the need to achieve timely surgical care while the mitigating risk

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associated with late night surgery we hypothesized that there would be an improvement in achieving wait time targets and that a decrease in less urgent operations from 2300 to 0700.

1. Methods

With REB approval (CW11-0274/H11-02,746), a retrospective three-year review was performed on all urgent and emergent surgeries at BC Children's Hospital from January 1, 2011, to December 31, 2013. The analysis utilized data from the Operating Room Scheduling Office System (ORSOS), which is a prospective operating room database. Data collected included booking time, room time, incision time, date of surgery, class, duration, surgeon, service, procedure as well as patient diagnosis and demographics. Booking time began to be recorded in ORSOS June 16, 2011. The surgeries were classified as follows:

- Class 1: STAT – Within 1 h.
- Class 2 A: Within 6 h.
- Class 2B: Within 24 h.
- Class 3: Within 72 h.

The duration from the booking time to in-room time was calculated to determine if the patient received surgical care within class target. Mean and median wait times as well as proportion within target were calculated for each urgency category class. Additionally, the mean and median times to skin incision for class 1 cases were measured. For cases in which there was a change to urgency class, the data were updated by changing both the booking time as well as the urgency class. The relative proportions of the different classes of surgery were also analysed based on age. These proportions were also broken down by age group: less than 44 weeks, 44 weeks–1 yr., ≥1–5 yrs., ≥5–12 yrs., and ≥12 yrs.

Based on the in room time, the percentage of surgeries performed out of hours (OOH) versus in hours (IH) was determined for each year. A surgery was considered IH if performed between 7:45 and 3:30, Monday to Friday (as this is the timeframe in which our operating room is fully staffed) and OOH if performed outside of this period, or on statutory holidays. The number of class 2B and class 3 surgeries with an in room time between 23:00 and 7:00 was also determined for each year.

A two-tailed Z-test was used to determine the statistical significance of differences between proportions from year to year, while a two-tailed T-test was used to determine the compared wait time values from year to year. Chi squared was used to compare the occurrence of class 2B and 3 surgeries from 2300 to 0700. A p-value of <0.05 was considered significant.

2. Results

In the study period 4668 patients underwent urgent/emergent surgery. Overall, 5.8% were class 1, 29.1% class 2 A, 42.1%, class 2B and 23.0% class 3 [Fig. 1]. When observing the relative proportions of the different urgency classes within each age group, the percentage of surgeries that were class 1 was greatest for the 44 weeks–1 yr. age group, at 13.8%. There was a significant decrease in class 2 A and 2B surgeries

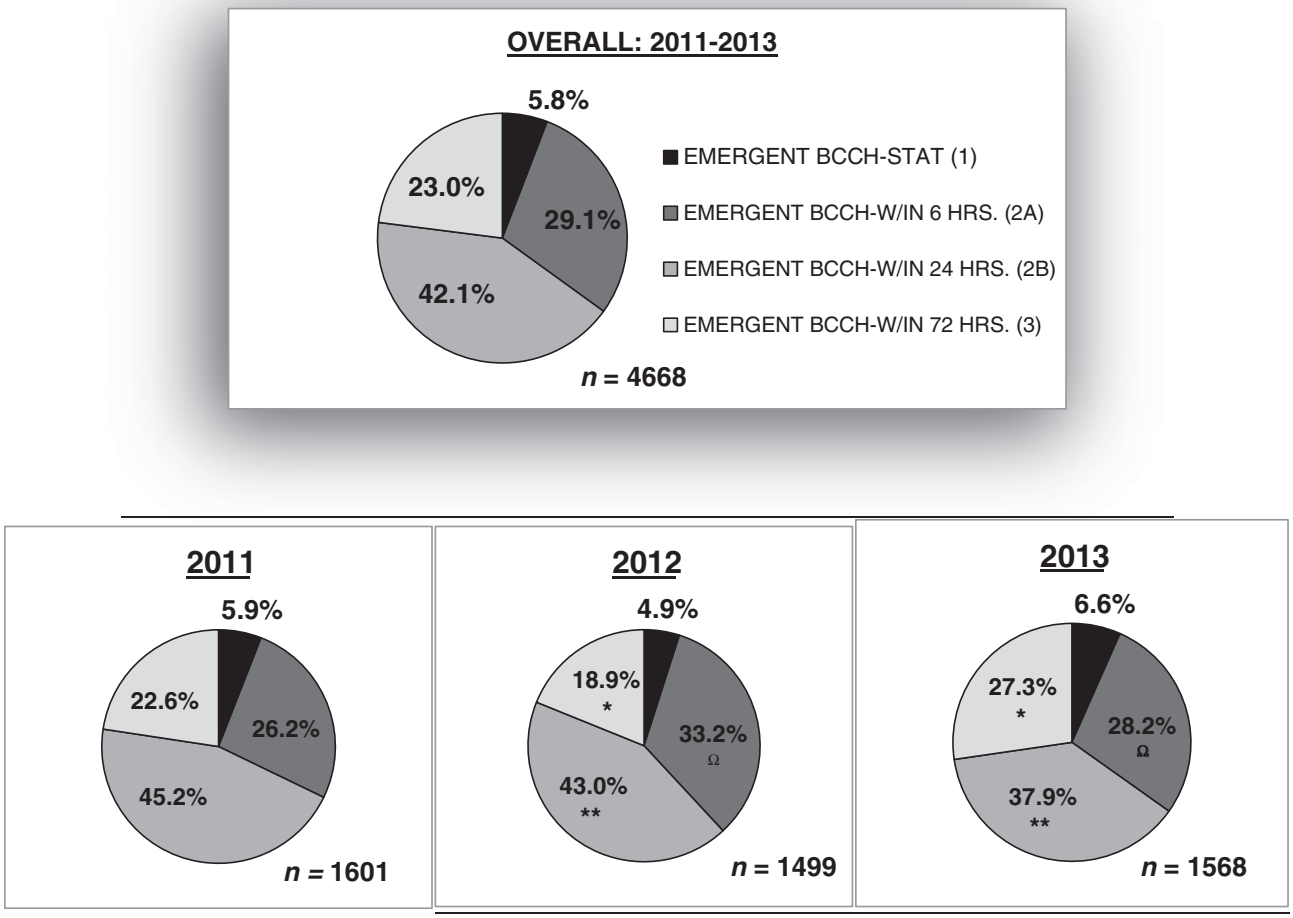

Fig. 1. Proportions of emergent surgeries by class and year. *p < 0.05 class 3 2012 vs. 2013; ** p < 0.05 2012 vs. 2013; Ω p < 0.05 class 2 A 2012 vs. 2013.