The Paediatric Resuscitation Room: Demographic analysis and predictors for admittance in Intensive Care Units

Ricardo Barreto Mota[1], Vicente Rey y Formoso[1], Sara Madureira Gomes[1], Sandra Neves[2], João Viana[3,4], Augusto Ribeiro[5], Ana Maia[1,6], Luís Almeida Santos[2,6]

Abstract

***Objective*: Epidemiological description of paediatric patients admitted in the resuscitation room, identify the main pathologies that lead to admittance, and analyse risk factors for intensive care admittance.**

***Design*: A retrospective study was conducted between January 2014 and December 2017. Data regarding epidemiology, provenance, means of transport, triage evaluation, clinical status, and attitudes employed before admission and in the resuscitation room, destination, and prognosis were collected. Collected data was then compared between admitted and non-admitted patients in any intensive care unit.**

***Setting*: Resuscitation Room of the Paediatric Emergency Department in a tertiary hospital in the north of Portugal.**

***Patients*: All paediatric patients (newborn to 17 years and 364 days of age). Three hundred and sixty-three patients were admitted.**

***Measurements and results*: Main causes for admission were active seizures (35%) and severe traumatic brain injuries (TBI) (18.8%). Forty-four point one percent were admitted to the intensive care unit (ICU). Multivariate analysis through binary logistic regression determined that admittance with a spinal board (p=0.012) and ventilatory support requirement (p=0.001) were independent positive risk factors for ICU admission, while being a frequent user of emergency services (p=0.016) and admission for active seizure (p=0.007) were negative risk factors. Trauma patients were the ones most likely to be admitted to the Paediatric Intensive Care Unit (PICU) (p<0.001). Among these, TBI was the most frequent cause for admission (p<0.031).**

***Conclusions*: Active seizure and trauma are the two situations most frequently addressed, the latter with the worst prognosis. It is paramount to hold frequent training and simulation sessions for health professionals to prepare the approach to these pathologies.**

Key words: Resuscitation room management, traumatic brain injury, seizures, Paediatric Intensive Care Unit.

1. Paediatrics Department, Centro Hospitalar e Universitário São João, Porto, Portugal
2. Paediatrics Emergency Department, Centro Hospitalar e Universitário São João, Porto, Portugal
3. Center for Health Technology and Services Research, Universidade do Porto, Portugal
4. MEDCIDS - Health Decision, Information and Community Medicine Department, Faculdade de Medicina, Universidade do Porto, Portugal
5. Paediatric Intensive Care Department, Centro Hospitalar e Universitário São João, Porto, Portugal
6. Department of Obstetrics-Gynecology and Pediatrics, Faculdade de Medicina, Universidade do Porto, Portugal

Address for correspondence:
Ricardo Barreto Mota
Centro Hospitalar e Universitário São João, Porto, Portugal
Alameda Prof. Hernâni Monteiro, 4200-319 Porto, Portugal
Email: rjdmota@gmail.com
ORCID: 0000-0001-7145-7073

Introduction

Addressing patients in the resuscitation room (RR) is a challenging task, (1,2) that requires the utmost preparation of all professionals involved. There is little information about the emergent approach to a paediatric patient in our country. Thus, the main goals of this study were to conduct an epidemiological description of the admission in the paediatric RR of a level III university hospital, to identify the main pathologies or events leading to admission, to describe interventions performed in the RR, and to analyse the prognosis of the admitted patients.

Methods

Our institution is a tertiary centre in the north of Portugal, with multidisciplinary support to paediatrics, including neurosurgery, cardiac surgery, paediatric

cardiology, paediatric oncology, and hereditary metabolic diseases. Its Paediatric Emergency Department is a metropolitan emergency service that provides primary assistance to 5 councils in the district of Porto and it also constitutes the reference service for urgent differentiated care in the north of the country. Besides being the place of immediate assistance to emergent situations, the RR is where the first assessment of patients transferred from other hospitals for the eventual admission to the Paediatric Intensive Care Unit (PICU) takes place. Paediatric intensivists often assist critically ill patients, with the collaboration, when necessary, of the above-mentioned specialties. The hospital is the headquarters for the Northern Paediatric Interhospital Transport (N-PIT), which ensures the transport of paediatric critically ill patients from all northern districts to places of tertiary care.

All patients admitted in the emergency service undergo an initial assessment by a nurse, who applies the Canadian Triage and Acuity Scale system (PaedsCTAS) (3) - giving a priority level of five possible, from minor to major: non-urgent ("blue", level V), non-urgent ("green", level IV), urgent ("yellow", level III), very urgent ("orange", level II), and emergent ("red", level I). In addition to the level of priority, the destination specialty is assigned. The first step is the assessment through the paediatric emergency triangle, assessing the state of consciousness, work of breathing, and circulation, considered as first-order modifiers. These parameters are weighted for age and the recording of pathological values leads to the assignment of severity levels between I and III. Second-order modifiers are then applied, which include fever, pain, mechanism of injury, glucose level, and coagulation disorders. Finally, the main complaint is recorded, always considering a subjective assessment of the child's well-being (to detect, for example, child abuse), dangerous behaviour of the child or adolescent, and relevant chronic pathologies.

We conducted a retrospective study including all paediatric patients (0 to 17 years and 364 days) admitted to RR between January 2014 and December 2017. Through consultation of the clinical files, we collected data regarding epidemiology, provenance, means of transport, triage evaluation, clinical status and attitudes practiced before admission, as well as status at admission, clinical activity employed in the RR, destination, and prognosis. We defined "frequent user" as a patient having more than 3 emergency episodes in one year. In addition to recording the cause of admission/main complaint, we grouped them by systems (neurological, cardiovascular, respiratory, otorhinolaryngology, digestive, musculoskeletal, dermatological, haematological, intoxication/psychiatric, and endocrinological), by ABCDE classification (airway, breathing, circulation, disability, exposure) and by endogenous (disease) or external (trauma, accident, aggression, or intoxication) cause. Severe traumatic brain injury (TBI) classification is defined by a paediatric Glasgow coma scale of less than 9. (4-8)

The final diagnosis was classified by organs and systems, including a category of 'trauma', which includes traumatic brain injury.

The immediate destination (PICU, observation in the emergency room [ER], infirmary, home, or death) and the last destination were recorded. To count the days of hospitalization we considered both admissions (for example, admitted to the intensive care unit [ICU] and later transferred to the infirmary). We only counted the length of stay of patients admitted to our hospital. The first hospital stay in an ICU or infirmary was considered the final hospital stay. Collected data were compared between admitted and non-admitted patients to determine risk factors for ICU admittance.

Statistical analysis was performed using the IBM SPSS Statistics version 26.0 program, with descriptive analysis followed by parametric tests for variables with normal distribution, non-parametric tests for variables with non-normal distribution, and chi-square or Fisher test for comparison between continuous variables. For correlation between continuous variables, Pearson and Spearman's tests were applied. Binary logistic regression was used for odds ratio calculation and for multivariate analysis. Statistical significance was considered when $p<0.05$.

The study was reviewed and approved by the institution's ethics committee.

Results

Demographic characterisation and admission data are presented in **Table 1**. During the studied period, 363 patients were admitted, five of which with missing data regarding ICU admission.

Table 2 describes reasons for admission to the emergency service. The most common motive was active seizure (35%) followed by severe TBI (18.8%). Admissions of an external cause (accident, trauma, aggression, or intoxication) accounted for 36.4% (132, one of which with missing data regarding ICU admission). When grouped by systems, the most common causes were neurological (68.9%), followed by respiratory (14.9%) and cardiovascular (5.1%).

Tables 3 and **4** describe the patient status and medical activity employed both in the pre-hospital set-

ting and in the RR, respectively. One hundred and twenty-one patients (33.3%) required ventilatory support before admission to the RR. Two patients with a need for ventilatory support in the RR and two patients with a need for airway adjunct in the RR were missing data regarding ICU admission. Nineteen patients had undergone cardiorespiratory arrest (CRA) before admission to the RR, 8 of whom were admitted in the RR while still in CRA. One hundred and fifteen patients (31.7%) had active seizures in the RR, 109 of whom required administration of anti-epileptics. Nineteen patients received inotropic support (8 due to CRA) and 2 were defibrillated (one due to supraventricular tachycardia and one due to cardiovascular arrest in the context of trauma). No patient entered with cardiac arrest in the RR.

Diagnoses are reported in **Table 5**. The most common final diagnosis was seizure (37.7%), which included febrile seizure, seizure in patients with known epilepsy, status epilepticus, and seizure with no defined cause, followed by TBI (14.1%), and by polytrauma without TBI (11.9%). Amongst the neurological conditions, one stroke, one cystic encephalopathy, eight intracranial haemorrhages, one acute disseminated encephalomyelitis, and two space-occupying lesions were admitted to the RR. Two patients admitted for neurologic pathology were missing data regarding ICU admission, one due to febrile seizure and one patient with previously known epilepsy presenting with active non-febrile seizure.

Table 6 describes the patient destination, referral, and prognosis. One hundred and two (28.3%) patients were discharged to the home, all after a period of observation in the emergency room, without the need for an infirmary or ICU stay. A total of 158 patients (44.1%) were eventually admitted to the ICU, 130 of whom were in our PICU. During the registered period, a total of 8 (0.02%) deaths occurred in the RR, all the victims of pre-hospital CRA. The causes were trauma in the context of a car accident, fall, septic shock, unspecified trauma, suicide by hanging, and 3 CRA of undetermined origin.

Differences in ICU admission rates are described throughout all the previously described tables. Children admitted in any ICU were older (median age 7.89 years, interquartile range [IQR] 2.4-14.5) and non-admitted children (3.83, IQR 1.7-10.7, p=0.001). There was a 6.5% increase in the odds of admission per additional year of age (p<0.001, odds ratio [OR] of 1.065 [1.027-1.104]). This difference was not observed when only considering patients admitted for medical reasons (p=0.134). Frequent users were admitted less frequently than non-frequent users (p<0.001). The most frequently admitted patients were those sorted with the highest priority level (p=0.019), those brought by means of transport other than their caregivers (p<0.001), those sorted for surgical specialties (p<0.001), and those admitted for external causes (p<0.001). There was also a higher percentage of patients admitted with ventilation and airway adjuvants prior to room admission (p<0.001, OR 11.1 [6.9-20.3]), as well as patients admitted on a spinal board (p<0.001, OR 6.2 [3.6-10.6]) and sedated (p<0.001, OR 9.6 [5.4-17.5]), differences that remained even when excluding trauma patients. Patients admitted due to active seizures were less admitted to ICU (p<0.001, OR 0.14 [0.08-0.247]); no difference in admission was found between patients undergoing anti-epileptics prior to admission to the RR and other patients. Regarding activity in the RR, patients with active bleeding (p=0.003, OR 2.6 [1.4-5]), ventilated (p<0.001, OR 18.7 [10.7-32.6]), undergoing volume expansion (p<0. 001, OR 4.6 [2.4-8.9]), and submitted to imaging studies (p<0.001, OR 5.3 [3.3-8.4]), computerized tomography (CT) (p<0.001, OR 2.8 [1.8-4.3]), ultrasound (p=0.005, OR 2.2 [1.3-3.8]) were most frequently admitted in the ICU. When excluding patients admitted for trauma, the difference between those who underwent ultrasound or CT scan and the rest of the patients was no longer observed, while the difference in the remaining parameters maintained. Patients undergoing lumbar puncture were admitted less frequently (p=0.001, OR 0.160 [0.06-0.47]). Patients admitted for trauma were more frequently admitted to the PICU (p<0.001). Selecting only trauma patients, it was found that TBI patients were more admitted than others (p=0.034). Patients with a diagnosis of seizure were less admitted to ICU (p<0.001). Within these, patients with status epilepticus were more admitted than the others (p<0.001). When performing a multivariate analysis through binary logistic regression, it was found that the independent factors for higher risk of ICU admission were admission in a spinal board (p=0.012, OR 5.7 [1.5-22.6]), ventilation dependency in RR (p=0.001, OR 17.1 [3.1-93. 9]), and radiography (p=0.001, OR 5 [2-12.4]), while frequent users (p=0.016, OR 0.27 [0.1-0.8]) those admitted under active seizure (p=0.001, OR 0.15 [0.05-0.44]) and those submitted to ultrasound (p=0.007, OR 0.16 [0.04-0.6]) were less admitted. This model had a non-significant Hosmer and Lemeshow value (p=0.942), suggesting that it was a suitable model.

There was no difference in length of stay between the different gender and no correlation between ages. It was found that frequent users stayed less

time in total (p=0.035), but no difference when comparing exclusive PICU or infirmary stay. Patients admitted for external causes had a longer total length of stay (p=0.003) and infirmary time (p=0.001), but no difference in ICU times (p=0.707). There was no difference in the length of stay when comparing the means of transport to the hospital. Patients ventilated before admission and those admitted on a spinal board had a higher total length of stay (p=0.035 and p=0.021), but no difference in the independent infirmary or PICU times. Outpatients with CRA had longer stay in PICU (p=0.023). There was no difference in hospital stay times comparing the remaining attitudes before admission to the RR. Patients with active seizures in the RR had a shorter stay in the PICU (p=0.035) and had a less total length of stay (p=0.035). Patients with airway adjuvants in the RR had longer total hospital stay (p=0.036). Patients undergoing any type of ventilation in the room had longer total hospital stay (p=0.010). Patients that underwent volume expansion (p=0.017), radiography (p=0.001), CT (p=0.038) or ultrasound (p=0.017) had longer total length of stay, with no differences in PICU length of stay. Patients submitted to lumbar puncture had a shorter total length of stay (p=0.010). There were no differences in length of stay between outpatient diagnoses.

Discussion

As previously described in the literature, there is great variability in the epidemiology and pathologies addressed in the room. (9) However, it is possible to highlight trends in which knowledge may lead to greater preparation.

Not all patients were screened with the highest level of priority. Forty-five patients were classified with either priority level II or III. Most were trauma cases brought in by pre-hospital emergency services, on a spinal board, whose clinical status did not justify the highest level of priority. They also included patients brought from other hospitals for tertiary evaluation (e.g., supraventricular tachycardia cases assessed and stabilised in other hospitals, referred to our hospital for assessment by paediatric cardiology). These admissions give the RR another function: a gateway and primary location for more differentiated assessment.

Despite the seriousness of the clinical condition that led to admission to the RR, 102 patients were subsequently discharged to their homes, without the need for an infirmary or intensive care admission. Most of these cases were admissions to RR due to active seizures, namely seizures in patients with already known epilepsy or febrile seizure who were discharged to their homes after a period of observation in the emergency room. There were also a few cases of mild trauma that entered the RR for the reasons described above, three cases of anaphylaxis, and supraventricular tachycardias resolved in the RR, after which the patients presented clinical stability. Also of note was the case of a conversive disorder that simulated an active seizure. These data allowed us to conclude that the teams were well prepared to solve critical situations and to detect non-critical admissions.

The most common causes of admission to the RR were neurological aetiology, with a predominance of convulsions. Recently, two reviews have been carried out in two other European countries, in one of which (2) seizures were also the main cause, while in the other (1) they were the second most frequent cause, after cardiovascular causes. This concordance of results strengthens the statistic that seizures are prevalent in paediatric age, being an important cause of urgent admission. (10-12) We also found that these patients were less admitted to the ICU, which was likely due to the fact, described above, that they occurred in patients with known epilepsies or simple febrile seizures, in which admission is often not necessary. One fact supporting this hypothesis is that frequent users were less admitted to a PICU and that 51 of the 73 frequent users were treated for seizures. In our study, most seizures were febrile or symptomatic remote, in line with the literature that describes them as frequent causes of admission to the RR. (13,14) However, it is described that the main cause of emergent admission and active seizures was status epilepticus, (10,11,15) which was the third most observed type of seizure in our study. This can be explained by the proximity of families to the hospital and the rapid response of pre-hospital transport services, which allows patients with simple febrile seizures and chronic patients to be assessed even in the early phase of seizures. The fact that patients can freely access ERs in Portugal without the need for previous referrals may also explain this early admittance. Patients with status epilepticus were more admitted to PICU than other types of seizures, which was consistent with the severity described in the literature. There was, however, no difference in the length of stay.

As shown in Lutz's (2) and Claudet's (1) studies, we found that trauma was an important cause of admission to the PICU and the second most frequent reason for admission in our study. The higher rate of PICU admission and the longer duration of stay shown in our study reflected the morbidity and mortality of paediatric trauma worldwide. (16-18) TBI is the most common trauma (46% of trauma cases),

the leading cause of death and disability in paediatric age worldwide. (4,5,7,8) In our study, it had a higher admission rate than other types of trauma, but there was no difference in the length of stay. This can be interpreted as adequate follow-up and treatment of these patients in our hospital. The approach to severe trauma in a pre-hospital setting involves, among other measures, the need for airway protection with endotracheal intubation and spinal board transportation. (6) Intubation is also performed in states of refractory epileptic disease and severe respiratory failure. (11) The admission of patients with these measures presupposes greater clinical instability, which justifies their higher frequency of admission in ICU and the reason why, in multivariate analysis, patients ventilated and admitted on a spinal board have higher odds of being admitted to the ICU. The higher admission of trauma patients in the ICU is also mirrored by the higher frequency of admission in patients who submitted imaging studies, namely radiography and CT.
As described in the Results section, 8 patients died in the RR. All had suffered cardiorespiratory arrest before admission to the RR, which constituted a worse prognosis. Eleven patients with previous cardiac arrests survived. This and the fact that no patient without a CRA died in RR were possible indicators of emergency team preparedness.
This study has several limitations, first the fact that it was a retrospective study. The data collection was based on clinical records carried out in the RR, which, as might be expected, are not always complete or written in real-time. We found several data particularly difficult to ascertain, namely: the pre-RR procedures (often described in very brief terms); doses, routes, and timings of drugs administration; length of stay in the RR; performance of ultrasound and whether it was according to the Focused Assessment with Sonography in Trauma (FAST) protocol or performed outside the room; length of stay in the ER; timing of lumbar puncture, and other techniques. We consider it would be relevant to conduct a prospective study in the RR, although we are aware of the difficulty this entails. It would be worth considering whether the records in the RR could be fulfilled by filling out a checklist by organs and systems instead of free writing. The method of categorising reasons for admission and diagnosis might have also induced bias. For example, some patients whose reason for admission was "airway compromise" (classified as respiratory motive) due to endotracheal tube admission in the context of trauma or epileptic disorder, would later be classified as Trauma or Neurological respectively in the final diagnosis record. To simplify the statistical analysis, we grouped them into external or endogenous motives, but this simplification might lead to bias.
For future studies, besides the prospective nature of an eventual study suggested above, we would also consider the register of the distance between the place of the event and the hospital and transportation time.

Conclusion

The resuscitation room is the place where patients in need of emergent assistance are admitted. For this reason, it is likely to become a place where disorganisation and anxiety in the assisting team is quickly established, with maximum preparation and organisation of professionals being paramount to ensure the best possible prognosis for the patient. With this study, it is possible to conclude that the approach to active seizure and trauma are the two situations most frequently addressed, the latter with the worst prognosis. In this sense, we believe it is paramount to hold frequent training and simulation sessions for health professionals to prepare and standardize the approach to these pathologies.

Table 1. Demography, origin, and patients' transport

	Total	ICU admission	No ICU admission	p
Male, n (%)	240 (66.1)	110 (46.2)	128 (53.8)	0.263
Age (years), median (interquartile range)	5.9 (1.82-13.4)	7.89 (2.4-14.5)	3.83 (1.7-10.7)	0.001
Frequent user, n (%)	73 (30.1)	15 (20.8)	57 (79.2)	<0.001
School cycle, n (%)				
- Non-attending	123 (33.9)			
- Preschool	62 (17.1)			
- Primary school	48 (13.8)			
- 5th and 6th grade	25 (6.9)			
- 7th to 9th grade	46 (12.7)			
- High school	59 (16.3)			
Admission during holiday or weekend, n (%)	122 (33.6)	60 (49.2)	62 (50.8)	0.167
Origin, n (%)				
- Walk-in	271 (59.8)			
- National Institute of Medical Emergency	80 (22)			
- Other NHS Hospital	54 (14.9)			
- Private clinic	7 (1.9)			
- Primary care provider	4 (1.1)			
- Outpatient consult	1 (0.3)			
Transport, n (%)				
- National Institute of Medical Emergency	207 (62.0)			
- Caretakers	73 (22.2)	11 (15.1)	62 (84.9)	<0.001
- N-PIT	39 (11.7)			
- Fire department	12 (3.6)			
- In-hospital transfer	2 (0.6)			

Legend: NHS=National Health Service; N-PIT=Northern Paediatric Interhospital Transport; ICU=intensive care unit.
Statistical analysis was performed through binomial logistic regression.

Table 2. Admission data

	Total, n (%)	ICU admission, n (%)	No ICU admission, n (%)	p
External cause - Road accident, n (% of total) - Fall, n (% of total) - Personal accident, n (% of total)	132 (36.4) 62 (17.2) 29 (8.1) 14 (3.9)	83 (63.4)	48 (36.6)	<0.001
Triage level - I (“red”) - II (“orange”) - III (“yellow”)	 318 (87.6) 41 (11.3) 4 (1.1)	 146 (46.5)	 168 (53.5)	 0.019
Triage group - Neurologic - Respiratory - Cardiovascular	 241 (68.9) 52 (14.9) 18 (5.1)			
Specialty - Medical (paediatrics) - Paediatric surgery - Neurosurgery - Ear, nose, and throat	 257 (70.8) 101 (27.8) 4 (1.1) 1 (0.3)	 88 (34.8)	 165 (65.2)	 <0.001
Common main triage complaints - Active seizure - Severe TBI - Altered mental status - Respiratory failure	 123 (35.0) 66 (18.8) 28 (7.9) 24 (6.8)			

Legend: TBI=traumatic brain injury; ICU=intensive care unit.
Statistical analysis was performed through binomial logistic regression.

Table 3. Patient status and activity conducted in the pre-hospital setting

Prior status	Total, n (%)	ICU admission, n (%)	No ICU admission, n (%)	p
Ventilatory support - Invasive mechanical ventilation - Manual insufflator	121 (33.7) 91 (79.1) 24 (20.9)	95 (79.8)	24 (20.2)	<0.001
Airway adjunct - Endotracheal tube - Oropharyngeal - Tracheostomy - Supraglottic	122 (34.6) 115 (31.7) 2 (0.6) 2 (0.6) 3 (0.8)	97 (80.8)	23 (19.2)	<0.001
Oxygen therapy	142 (41.4)	100 (71.4)	40 (28.6)	<0.001
Sedation	89 (24.5)	71 (79.8)	18 (20.2)	<0.001
Anti-epileptics	76 (20.9)	27 (36.0)	48 (64.0)	0.138
Spinal board	89 (24.5)	65 (73.9)	23 (26.1)	<0.001
Cardiorespiratory arrest	19 (5.3)	9 (50)	9 (50)	0.596
Vasopressor or inotropic support	16 (4.5)	8 (50)	8 (50)	0.614
Chest compressions	18 (5.0)	9 (52.9)	8 (47.1)	0.446
Defibrillation	2 (0.6)	1 (100)	0	-

Legend: ICU=intensive care unit.
Statistical analysis was performed through binomial logistic regression.

Table 4. Patient status and activity conducted in the Resuscitation Room (RR)

RR status	Total, n (%)	ICU admission, n (%)	No ICU admission, n (%)	p
Ventilatory support - Invasive mechanical ventilation - Manual insufflator - Non-invasive ventilation	133 (37.5) 107 (29.5) 16 (4.4) 1 (0.3)	108 (82.4)	23 (17.6)	<0.001
Airway adjunct - Endotracheal tube - Oropharyngeal - Tracheostomy - Supraglottic	142 (39.1) 115 (31.7) 5 (1.4) 2 (0.6) 4 (1.1)	116 (82.9)	24 (17.1)	<0.001
New airway adjunct in the RR	22 (15.5)	19 (82.6)	3 (17.4)	0.636
Replaced airway adjunct to endo-tracheal tube	16 (11.3)	16 (100)	0	-
Removed airway adjunct	13 (9.3)	2 (15.4)	11 (84.6)	<0.001
Active seizure	115 (31.9)	18 (15.8)	96 (84.2)	<0.001
Anti-epileptics	109 (30.4)	18 (16.7)	90 (83.3)	<0.001
Active haemorrhage	48 (13.3)	31 (64.6)	17 (35.4)	0.003
Fluid bolus	55 (15.3)	40 (74.1)	14 (25.9)	<0.001
Cardiorespiratory arrest	9 (2.5)	1 (11.1)	8 (88.9)	0.079
Simple chest radiography	129 (35.6)	88 (69.3)	39 (30.7)	<0.001
Computerized tomography	163 (44.9)	93 (57.8)	68 (42.2)	<0.001
Ultrasound	66 (18.2)	39 (60.0)	26 (40.0)	0.005
Lumbar punction	32 (8.8)	4 (12.5)	28 (87.5)	0.001
Thoracocentesis	3 (0.8)	2 (66.7)	1 (33.3)	0.446

Legend: ICU=intensive care unit.
Statistical analysis was performed through binomial logistic regression.

Table 5. Common diagnosis within each category

Common diagnosis within each category	Total, n (%)	ICU	Non-ICU	p
Neurologic	150 (41.3)	31 (20.9)	117 (79.1)	<0.001‡
- Seizure	136 (37.7)	20 (14.9)	114 (85.1)	<0.001‡
- Febrile seizure, n (% within seizure)	46 (36.8)	0*	45 (100)*	0.001*‡
- Seizure in epileptic patient, n (% within seizure)	37 (22.2)	3 (8.3)*	33 (91.7)*	0.194*‡
- Status epilepticus, n (% within seizure)	27 (19.9)	16 (59.3)*	11 (40.7)*	<0.001*§
- Intracranial haemorrhage	8 (2.2)	7 (87.5)	1 (12.5)	0.024§
Trauma	117 (32.2)	80 (69.0)	36 (31.0)	<0.001‡
- TBI	51 (14.1)	41 (80.4) †	10 (19.6)†	0.031†‡
- Polytrauma without TBI	43 (11.9)	33 (78.6) †	9 (21.4)†	0.137†‡
- Non-specified trauma	13 (0.6)	2 (15.4)†	11 (84.6)†	<0.001†§
Respiratory	31 (8.5)	21 (70.0)	9 (30.0)	0.003‡
- Bronchiolitis	13 (3.6)			
- Respiratory failure	7 (1.9)			
Cardiac	18 (4.9)	5 (27.8)	13 (72.2)	0.152‡
- Supraventricular tachycardia	9 (2.5)			
- CRA	5 (1.4)			
Infection	17 (4.7)	7 (43.8)	9 (56.3)	0.975‡
- Pneumonia	5 (1.4)			
- Meningoencephalitis	3 (0.83)			

Legend: TBI=traumatic brain injury; CRA=cardiorespiratory arrest; ICU=intensive care unit.
*Within total seizures; †Within total trauma. ‡Chi-square test; §Fisher's exact test.

Table 6. Patient destinations and duration of admission

Immediate destination, n (%)	
- Observation room	211 (61.7)
- PICU	113 (33.0)
- OR	10 (2.9)
- Deceased in RR	8 (2.2)
Second destination, n (%)	
- Discharged home	102 (28.3)
- Our hospital's infirmary	63 (17.5)
- Other hospital's infirmaries	29 (8.1)
- Our hospital's PICU	130 (36.1)
- Other PICU	18 (5.0)
- Our hospital's NICU	1 (0.3)
- Other NICU	7 (1.9)
- Burn unit	2 (0.6)
- Deceased in RR	8 (2.2)
- Total ICU admission	158 (44.1)
Admission duration, median days (IQR)	
- Our hospital's PICU	5 (2-13)
- Our hospital's infirmary	7 (4-16)
- Total admission	11 (5.5-29)

Legend: PICU=paediatric intensive care unit; OR=operating room; RR=resuscitation room; NICU=neonatal intensive care unit; IQR=interquartile range.

References

1. Claudet I, Bounes V, Fédérici S, Laporte E, Pajot C, Micheau P, et al. Epidemiology of admissions in a pediatric resuscitation room. Pediatr Emerg Care 2009;25:312-6.
2. Lutz N, Vandermensbrugghe NG, Dolci M, Amiet V, Racine L, Carron P-N. Pediatric emergencies admitted in the resuscitation room of a Swiss university hospital. Pediatr Emerg Care 2014;30:699-704.
3. Warren DW, Jarvis A, LeBlanc L, Gravel J, CTAS National Working Group, Canadian Association of Emergency Physicians, et al. Revisions to the Canadian Triage and Acuity Scale paediatric guidelines (PaedCTAS). CJEM 2008;10:224-43.
4. Araki T, Yokota H, Morita A. Pediatric Traumatic Brain Injury: Characteristic Features, Diagnosis, and Management. Neurol Med Chir (Tokyo) 2017;57:82-93.
5. Belisle S, Lim R, Hochstadter E, Sangha G. Approach to Pediatric Traumatic Brain Injury in the Emergency Department. Curr Pediatr Rev 2018;14:4-8.
6. Fein DM, Fagan MJ. Overall Approach to Trauma in the Emergency Department. Pediatr Rev 2018;39:479-89.
7. Dewan MC, Mummareddy N, Wellons 3rd JC, Bonfield CM. Epidemiology of Global Pediatric Traumatic Brain Injury: Qualitative Review. World Neurosurg 2016;91;497-509.e1.
8. Sarnaik A, Ferguson NM, O'Meara AMI, Agrawal S, Deep A, Buttram S, et al. Age and Mortality in Pediatric Severe Traumatic Brain Injury: Results from an International Study. Neurocrit Care 2018;28:302-13.
9. Lanoix R, Golden J. The facilitated pediatric resuscitation room. J Emerg Med 1999;17:363-6.
10. Agarwal M, Fox SM. Pediatric seizures. Emerg Med Clin North Am 2013;31:733-54.
11. Smith KA, Flori HR. Critical Care in the Pediatric Emergency Department. Pediatr Clin North Am 2018;65:1119-34.
12. Lawton B, Deuble N. Seizures in the paediatric emergency department. J Paediatr Child Health 2016;52:147-50.
13. Patterson JL, Carapetian SA, Hageman JR, Kelley KR. Febrile seizures. Pediatr Ann 2013;42:249-54.
14. Singh RK, Gaillard WD. Status epilepticus in children. Curr Neurol Neurosci Rep 2009;9:137-44.
15. Tully I, Draper ES, Lamming CR, Mattison D, Thomas C, Martland T, et al. Admissions to paediatric intensive care units (PICU) with refractory convulsive status epilepticus (RCSE): A two-year multi-centre study. Seizure 2015;29;153-61.
16. Svantner J, Dolci M, Heim C, Schoettker P. Pediatric Trauma: Six Years of Experience in a Swiss Trauma Center. Pediatr Emerg Care 2021;37:e1133-8.
17. Muisyo T, Bernardo EO, Camazine M, Colvin R, Thomas KA, Borgman MA, et al. Mortality prediction in pediatric trauma. J Pediatr Surg 2019;54:1613-6.
18. GBD 2017 Child and Adolescent Health Collaborators; Reiner Jr RC, Olsen HE, Ikeda CT, Echko MM, Ballestreros KE, et al. Diseases, Injuries, and Risk Factors in Child and Adolescent Health, 1990 to 2017: Findings From the Global Burden of Diseases, Injuries, and Risk Factors 2017 Study. JAMA Pediatrics 2019;173: e190337.