Sedation Provided for Consultations in the Pediatric Emergency Department: Another Perspective

Rotem Rephaeli MD[1], David Rehktman MD[2], Itai Gross MD[3] and Giora Weiser MD[1]

[1]Department of Pediatric Emergency Medicine, Shaare Zedek Medical Center, Jerusalem, Israel
[2]Department of Pediatric Emergency Medicine, Hadassah Medical Center, Mount Scopus Campus, Jerusalem, Israel
[3]Department of Pediatric Emergency Medicine, Hadassah Medical Center, Ein Kerem Campus, Jerusalem, Israel

ABSTRACT: **Background:** Many procedures requiring sedation in the pediatric emergency department are performed by consultants from outside the department. This team usually includes orthopedic surgeons and general surgeons. As sedation is now a standard of care in such cases, we evaluated consultants' views on sedation.

Objectives: To evaluate consultants' views on sedation.

Methods: A questionnaire with both open-ended questions and Likert-type scores was distributed to all orthopedic surgeons and general surgeons performing procedures during the study period. The questionnaire was presented at three medical centers.

Results: The questionnaire was completed by 31 orthopedic surgeons and 16 general surgeons. Although the vast majority (93–100%) considered sedation important, a high percentage (64–75%) would still perform such procedures without sedation if not readily available.

Conclusions: Sedation is very important for patients and although consultants understand its importance, the emergency department staff must be vigilant in both being available and not allowing procedures to "escape" the use of sedation.

IMAJ 2020; 22: 5–7

KEY WORDS: emergency medicine, orthopedic surgeon, pediatric, sedation, surgeon

Procedural sedation and analgesia (PSA) is the standard of care for painful and stressful procedures in the pediatric emergency department (PED) [1,2]. This well-established practice is firmly stated in many guidelines relating to activity with the pediatric population [3-5]. Sedation in the PED is mostly preformed by pediatricians and pediatric emergency medicine specialists as per well-established guidelines and credentialing [6].

In Israel, many painful procedures in the PED are performed by consultants (most commonly fracture reduction by orthopedic surgeons, laceration repair by plastic surgeons, and wound and abscess care by general surgeons). These procedures are generally conducted using PSA when needed. However, consultants' opinions of PSA and its impact on the procedure performed has not been assessed [7]. The literature widely recognizes the satisfaction of the medical staff performing the sedation as well as the family and patients. Yet, there is no specific addressing consultants' points of view on sedation [8].

In the Jerusalem area, there are three hospitals serving the majority of the fast-growing pediatric population. These PEDs commonly use consultants for various procedures, the most common consultants being orthopedic surgeons and general surgeons. A questionnaire [Figure 1] was given to the various consultants in these fields following procedures in the PED to assess their outlook on PSA in the PED [9].

PATIENTS AND METHODS

This multicenter study was based on a questionnaire given to all orthopedic and general surgeons following a procedure in the PED. The study was performed in three medical centers: Shaare Zedek Medical Center and Hadassah Medical Centers (Ein Kerem campus and Mount Scopus campus).The questions consisted of personal opinions on PSA activity regarding their work load and a Likert-type questionnaire on PSA safety and efficacy.

The results were compiled in an Excel database 2017 (Microsoft, USA). The Chi-square test was used to compare proportions. A P value of ≤ 0.05 was considered statistically significant. Statistical analyses were performed using IBM Statistical Package for the Social Sciences statistics software, version 21 (SPSS, IBM Corp, Armonk, NY, USA).

RESULTS

The questionnaire was completed by 31 orthopedic surgeons and 16 general surgeons in the three centers. No significant differences were found among the three centers [Table 1].

Both orthopedic surgeons (92.9%) and general surgeons (93.3%) had performed painful procedures in the past without PSA. Of orthopedic surgeons, 30% had prior experience with distraction techniques compared with only 6.3% of general surgeons.

All of the orthopedic surgeons and 93.8% of general surgeons viewed PSA as an important part of patient care and

Figure 1. Sedation survey for consulting physicians in the PED, translated into English

Questions

1. What is your field of specialty?
2. Are you a resident or attending?
3. How many years of experience do you have?
4. Have you participated in a sedation providers course?
5. If yes, when approximately was this?
6. Do you perform sedation yourself?
7. In which procedures do you commonly use sedation?
8. Which medications were used for the sedation?
9. Have you performed such procedures without sedation in the past?
10. Have you used a sedation service or anesthesia for these procedures?
11. Do you use child life options (clowns, etc.)
12. Who usually asks for the sedation?
13. Do you think sedation for these procedures is important?
14. Do you still perform these procedures without sedation?
15. If yes, what is the reason?
16. Are you satisfied with the level of sedation provided by the PED physicians?
17. Does the PED staff availability for sedation effect the number of cases performed with sedation?
18. Have you witnessed significant side effects from sedation?
19. If yes, how often?
20. If yes, what side effects did you witness? Did they prevent the completion of the procedure?

Please grade the following answers
(1= completely agree, 2= agree, 3=neutral, 4= disagree, 5= strongly disagree)

Question	5	4	3	2	1
Personal satisfaction from performance with sedation					
Sedation improves the procedure outcome					
Sedation impairs my performance					
Sedation endangers the patient					
Sedation improves the patients stress					
I always use sedation for painful procedures					
Sedation prolongs patient stay unnecessarily					
The sedation provider provides a high level of patient safety					

both specialties (90% orthopedic surgeons and 81% general surgeons) initiated the request for PSA.

Orthopedic surgeons (64.5%) and general surgeons (75%) will continue to perform procedures without PSA when it is not readily available (busy PED or outpatient setting; $P = 0.47$).

Orthopedic surgeons were more likely to give satisfactory scores for PSA compared to general surgeons. [Table 2]. Orthopedic surgeons expressed a greater likelihood to perform painful procedures strictly with PSA compared to general surgeons ($P = 0.002$).

DISCUSSION

This study aimed to understand the perceptions on PSA by providers who consult the PED teams. The medical team specifically included orthopedic surgeons and general surgeons who were involved in the most common painful procedures performed in the PED. The findings of this study can provide the PED team a better understanding of the expectations the consultants have when arriving to the PED.

The results were similar in three different medical centers, although the orthopedic surgery overlapped at times at the Hadassah campuses in the Jerusalem area.

The results showed that both surgical specialties recognized and appreciated the value of using PSA to complete procedures; however, when PSA was not readily available, both orthopedic surgeons and general surgeons would perform a painful procedure without PSA. These finding are contradictory and need to be addressed while managing a busy PED. The use of consultants can be important; however, their performing procedures must stay within the limits of accepted standard of care in the PED.

As orthopedic surgeons commonly perform fracture reductions in the PED, it is not surprising that they view PSA more positively and find it influential in successful completion of the procedure (orthopedic surgeons 90.3% vs. general surgeons

Table 1. Highlights of study results

	Orthopedic surgeon (n=31)	General surgeon (n=16)	*P* value (when relevant)
Attending/resident	4/27	3/13	
Perform sedations on your own?	12.9%	6.7%	0.52
Performed procedures without sedation in the past?	92.9%	93.3%	0.96
Initiate request for sedation?	90.3%	81.3%	0.39
Sedation is important to you?	100%	93.8%	0.17
Still perform procedures without sedation?	64.5%	75%	0.47

Table 2. Procedure satisfaction and success by Likert-type scores (1 = highly agree, 2 = agree, 3 = noncommitted, 4 = disagree, 5= highly disagree)

Question	Likert score	Orthopedic surgeon (%)	General surgeon (%)
Overall satisfaction	1 2 3	100 0 0	81.3 12.5 6.3
Improved procedure success	1 2 3 4 5	90.3 9.7 0 0 0	75 12.5 0 6.3 6.3

75%). The impact of PSA on patient satisfaction as seen by the consultant also seems more positive by the orthopedic surgeons (90.3%) vs. general surgeons (68.8%). This finding explains the statistically significant results ($P = 0.002$) showing that orthopedic surgeons more often will attempt to use PSA compared to general surgeons.

CONCLUSIONS

PSA has become the standard of care in Israeli PEDs. The findings in this study need further evaluation both in number of participants as well as the medical centers included. Time and acceptance of PSA in specific centers may also have an impact. However, these preliminary findings indicate a need to have PSA available as much as possible. Consultants should not consider performing painful procedures without PSA.

Correspondence
Dr. G. Weiser
Dept. of Pediatric Emergency Medicine, Shaare Zedek Medical Center, Jerusalem 94342, Israel
Phone: (972-2) 655-5781, **Fax:** (972-2) 655-5783
email: gioraweiser@gmail.com

References

1. Jain S. Sedation: a primer for pediatricians. *Pediatr Ann* 2018, 47: e254-8.
2. Ramalho CE, Bretas PMC, Schvartsman C, Reis AG. Sedation and analgesia for procedures in the pediatric emergency room. *J Pediatr (Rio J)* 2017; 93 Suppl 1: 2-18.
3. Khurmi N, Patel P, Kraus M, Trentman T. Pharmacologic considerations for pediatric sedation and anesthesia outside the operating room: a review for anesthesia and non-anesthesia providers. *Paediatr Drugs* 2017; 19: 435-46.
4. Cravero JP, Havidich JE. Pediatric sedation--evolution and revolution. *Paediatr Anaesth* 2011; 21: 800-9.
5. Leroy PL, Gorzeman MP, Sury MR. Procedural sedation and analgesia in children by non-anesthesiologists in an emergency department. *Minerva Pediatr* 2009; 61: 193-215.
6. Shavit I, Hershman E. Management of children undergoing painful procedures in the emergency department by non-anesthesiologists. *IMAJ* 2004; 6: 350-5.
7. Migita RT, Klein EJ, Garrison MM. Sedation and analgesia for pediatric fracture reduction in the emergency department: a systematic review. *Arch Pediatr Adolesc Med* 2006; 160: 46-51.
8. Delgove A, Harper L, Berciaud S, Lalioui A, Angelliaume A, Lefevre Y. Efficacy, pain, and overall patient satisfaction with pediatric upper arm fracture reduction in the emergency department. *Orthop Traumatol Surg Res* 2019: S30051-9.
9. Connor MP, Dion GR, Borgman M, Maturo S. The pediatric sedation unit: a prospective analysis of parental satisfaction. *Int J Pediatr Otorhinolaryngol* 2014; 78: 2165-8.

Capsule

Stabilizing cell-type ratios

Brain development depends both on having enough neurons and on those neurons being connected in the right ways. **Willett** et al. found that in mice, disruption of excitatory neurons of the cerebellar nuclei, either by inactivating genes encoding specific transcription factors or by dosing the neurons with diptheria toxin, resulted in an undersized cerebellum. The size disparity was a result of fewer downstream connected cells, including granule cells, Purkinje cells, and interneurons. Despite the cerebellum having too few cells, the ratio of cell types stayed normal. Thus, the number of excitatory cerebellar nuclei neurons defines survival of a matched set of Purkinje cells. The correct ratios of cells needed to establish functional circuits are maintained by a mix of strategies that regulate both proliferation and survival of neurons.

eLife 2019; 8: e50617
Eitan Israel

Capsule

Detection of collagens by multispectral optoacoustic tomography as an imaging biomarker for Duchenne muscular dystrophy

Biomarkers for monitoring of disease progression and response to therapy are lacking for muscle diseases such as Duchenne muscular dystrophy. Noninvasive in vivo molecular imaging with multispectral optoacoustic tomography (MSOT) uses pulsed laser light to induce acoustic pressure waves, enabling the visualization of endogenous chromophores. **Regensburger** and co-authors described an application of MSOT, in which illumination in the near- and extended near-infrared ranges from 680–1100 nm enables the visualization and quantification of collagen content. The authors first demonstrated the feasibility of this approach to noninvasive quantification of tissue fibrosis in longitudinal studies in a large-animal Duchenne muscular dystrophy model in pigs, and then applied this approach to pediatric patients. MSOT-derived collagen content measurements in skeletal muscle were highly correlated to the functional status of the patients and provided additional information on molecular features as compared to magnetic resonance imaging. This study highlights the potential of MSOT imaging as a noninvasive, age-independent biomarker for the implementation and monitoring of newly developed therapies in muscular diseases.

Nature Medicine 2019; 25:1905
Eitan Israeli