

SA-CME Information

Managing Anxiety and Minimizing Sedation Requirements in the Pediatric Radiation Oncology Population

Description

This review article provides a thorough outline of various modalities to help guide implementation of strategies to reduce anxiety in treatment facilities. Categories include interventions before treatment (psychoeducational interventions, play therapy) and during treatment (specialized staff, environmental modifications, distraction, reward/incentive systems).

Learning Objectives

- Develop an understanding of the drawbacks of using sedation in the pediatric radiation oncology setting.
- Identify the various interventions available to reduce the need for sedation.
- Be able to develop a more nuanced plan for implementing various intervention into their own practice.

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Managing Anxiety and Minimizing Sedation Requirements in the Pediatric Radiation Oncology Population

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The use of radiation therapy (RT) is an integral part of the treatment process in the field of pediatric oncology. RT requires a high degree of precision to successfully target malignant cells while sparing normal tissue. As a result, patients must remain still for extended periods and are frequently required to use immobilization devices during treatment. This, in combination with the need to be isolated in a treatment room, undoubtedly produces considerable anxiety for children.

Due to pediatric distress from the treatment process, general anesthesia is frequently required in RT for sedation purposes. Provider surveys suggest the median age at which anesthesia is no longer required is approximately 6 years.¹ Some institutions routinely use general anesthesia for all patients up until age 7.^{2,3} While sedation has benefits regarding ease of immobilization, there are considerable drawbacks to this process. First, sedation is invasive and carries potential health risks including increased risk of sepsis associated with central line placement routinely required for administration of medications.⁴ In addition, anesthesia increases

total time spent in the treatment center while dictating rigid scheduling restraints for both treatment facilities and patients (eg, fasting before treatment).¹ These requirements may be disruptive to a child's ability to maintain social connection and attend school.

More time in the facility also translates to increased staffing requirements, including individuals capable of handling sedated patients, thus leading to a significant cost burden to treatment facilities. Health care cost savings as high as 36% have already been noted in studies that seek ways to reduce the sedation requirement in RT.⁵

The invasive nature, as well as increased risks and costs have led toward a conscious movement to minimize anesthesia in pediatric RT.³ Several studies have demonstrated the efficacy of particular interventions to reduce anxiety and sedation in pediatric radiation oncology patients through the facilitation of effective coping methods.⁵⁻¹⁴ Adequate implementation of these interventions, however, remains difficult for many facilities. Providers surveyed on this topic have suggested that lack of awareness of available tools and strategies continues

to be a leading obstacle to putting these practices into use.¹ As such, this review seeks to provide a thorough outline of various modalities to help guide implementation of strategies to reduce anxiety in treatment facilities.

Interventions Prior to Initiation of Radiation Therapy Treatment *Psychoeducational Interventions*

Psychoeducational interventions are humanistic methods of providing patients and caregivers with resources to cope with an illness. In general, these interventions tend to provide information in a way that addresses the psychological and emotional challenges a patient may face. This ranges from explaining general information about treatment and side effects to providing problem-solving strategies for coping with the disease.¹⁵ Psychoeducational interventions in this review are categorized by noninteractive and interactive methods:

Noninteractive education. This provides passive education by a variety of methods including meeting with the staff/nurses prior to treatment, a tour of the facility, video information about treatment, and information pamphlets.^{1,16} These traditional interventions intend to familiarize pediatric patients and caregivers with the medical team and treatment process. Meeting in advance with the treatment team gives patients and caregivers the opportunity to ask questions and plan coping strategies before treatment begins. Seeing the

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FIGURE 1. Select examples of creative mask decorations for pediatric patients receiving radiation therapy at our institution. Permission granted by Adeline Li, RTT, a radiation therapist at New York-Presbyterian Hospital, to showcase the masks she created.

treatment suite either by video or via in-person tour provides the child an early opportunity to become comfortable with unfamiliar medical equipment.

Interactive education. This allows the patient to relate to the treatment experience at a slower pace and develop effective coping strategies. In medical settings, interactive education has been shown to be more effective than traditional, noninteractive education in terms of promoting information recall and compliance with medical advice.¹⁷ RT facilities use a variety of realistic and virtual interactive tools that mainly work to desensitize the child to the RT process. Realistic tools include practicing laying still at home or at the treatment center and performing a “dry run” of the intended treatment. Virtual interventions utilize web-based tools, apps, and augmented/virtual reality to explore the treatment space. Both methods provide children ample opportunity

to develop coping strategies for laying still prior to initiation of treatment. The “dry run” strategy has the additional benefit of allowing children to become comfortable with the imaging and radiation equipment and has been shown to contribute to patient desensitization and reduce sedation needs in pediatric RT.¹²

Play Therapy

Another intervention commonly used before treatment involves the use of play. The therapeutic use of play includes a spectrum of interventions varying by the complexity of problems the child faces.¹⁸ These interventions allow the child to interact with the environment in a way that relieves anxiety and builds familiarity within an unfamiliar setting:

Spontaneous play. This is utilized for less complex problems and allows the child to naturally interact with their surroundings without intervention from others. Methods of this type of

play involve animal therapy and use of a children’s play area. Although this method of play may not be effective for developing coping around complex problems, spontaneous play can effectively reduce overall anxiety with an unfamiliar environment. For example, simply providing children with toys before undergoing medical procedures has been shown to relieve patient anxiety.¹⁹ These interventions can be effectively implemented in the waiting area so children can relieve stress prior to and even after treatment. In this manner, children will develop a positive association with the treatment facility.

Medical play. This is used for more complex emotional problems and is administered by a trained professional, often a child life specialist (CLS) or social worker, in the health care setting. This type of play involves letting the child interact with medical devices with the goal of developing effective coping methods before treatment. This type of therapy allows children to “play out” their feelings and anxieties.²⁰ An experienced professional can then help the child build strategies for dealing with these negative emotions. Medical play can be implemented in a way that allows the patient to develop a feeling of agency in their own treatment. For example, playing with teaching dolls and treatment machine models allows the child to play the role of provider. They can then externalize the fears their doll may have, which can be addressed by the CLS. Based on recent provider surveys received by members of the Children’s Oncology Group (COG) from 84 institutions, the most common medical play intervention used by providers is mask decoration (71%).¹ Masks can be decorated by the child to depict a favorite superhero or cartoon character to develop a degree of pride. Some creative examples are demonstrated in **Figure 1**. In addition, children can make masks for family and members of the treatment team to create a sense of shared experience. To gain familiarity with

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radiation treatment itself, sites also use models of treatment machines, radiology coloring books, and teaching dolls. These interventions allow the child to understand how treatment works and what RT accomplishes. Medical play is among the most researched and efficacious intervention in pediatric RT with multiple studies showing either a reduction in sedation requirement^{7,10} or in patient anxiety with this technique.¹³ This intervention also produces a significant health care cost reduction largely through decreased anesthesia use.⁷

Interventions During Radiation Therapy Treatment **Specialized Staff**

Pediatric patients have unique developmental and psychological needs in the medical setting. Specially trained staff, including CLS staff and social workers, are frequently utilized by RT facilities to care for their pediatric population. CLS staff are reportedly utilized in over half of pediatric RT centers.^{1,16} CLSs use developmentally appropriate and individualized strategies to assist children and families with the psychological burden of pediatric illness.²¹ In addition, CLS staff are trained in a variety of interventions already mentioned. Integrating a CLS program in RT helps decrease psychological anxiety and sedation needs,⁷ as well as reduce overall treatment costs.^{7,21,22} In RT facilities that see a smaller volume of pediatric patients, CLSs may not be available. In such cases, regular staff specially trained in various interventions discussed here can be utilized. If special training is not possible, a consistent treatment team can increase a child's familiarity with the staff. Although not specifically studied in pediatric RT, the use of a consistent treatment team is commonly implemented by RT providers¹ and has preceded use for pediatric patients at increased risk of distress in pediatric medical oncology.²³

Environmental Modifications

The medical environment where a child receives care has been shown to have a significant effect on a patient's anxiety.²⁴ Therefore, designing interventions aimed at making the medical environment more comforting to pediatric patients can have a significant psychological impact on children undergoing treatment. RT providers have reported using child-friendly décor and allowing patients to ride into the treatment vault on a toy car or airplane. Modifying the environment in this way creates a sense of comfort with the medical setting and has been shown to improve patient satisfaction in comparable pediatric settings.²⁴

Distraction

This includes interventions that aim to shift the child's attention away from negative emotion toward more favorable stimuli. This form of intervention is one of the most frequently utilized by pediatric RT providers.^{1,16} and serves primarily to alleviate anxiety during treatment. Frequent techniques involve the use of comfort objects for the child to hold, music therapy, aromatherapy, movies, or audiobooks. In the setting of pediatric RT, music therapy has been the most extensively studied with noted benefit during treatment as well as making children potentially open to additional psychosocial support.⁶ Music therapy appears to be effective when the child is able to create an individualized playlist beforehand. This method could be imitated for other distraction techniques by allowing the child to select an audiobook or video to watch during treatment.

Another form of distraction involves allowing communication with the caregiver during treatment setup or treatment delivery. Roughly half of pediatric RT providers report using some form of caregiver interaction with the patient once treatment has begun.^{1,16} When the child is in the treatment vault, communication with the caregiver can be maintained via two-way audio or video, or

by allowing the caregiver to remain in the treatment vault with a lead shield.

Reward/Incentive Systems

Use of a reward system provides incentives for children to complete RT and instills a sense of accomplishment throughout the treatment process. Rewards can be used both after each treatment session as well as at the conclusion of the entire treatment course. Incentives after each RT session include allowing the child to select a prize from a treasure chest and implementing a bravery bead program. Bravery beads are common in pediatric oncology due to the number of procedures/interventions involved. This activity involves the child creating a necklace of different types of beads that are given after various procedures. This necklace becomes a way to commemorate the treatment process and helps children communicate their experience to others.²⁵ End-of-treatment celebrations are also common in the RT setting, although it is important to note that, in adults, ringing a cancer bell to celebrate treatment completion has been associated with increased levels of overall distress from cancer treatment at follow-up. However, it is unclear if this association is present in the pediatric population.²⁶

A unique way to allow children to document and memorialize their treatment is to encourage them to record a video documentary of themselves throughout the process.¹¹ Children who undergo this movie-making project report increased willingness to undergo treatment since they can record in real-time what RT is like for them. This project also facilitates the ability to communicate their experiences and allows for smoother reintegration back to school. After the fact, a movie-making program could serve as a form of psychoeducation if videos are shared with children who have not yet begun treatment.

Conclusion

This review highlights multiple resources in practice that lead to a reduction

in anxiety and better toleration of RT for children. Anxiety minimization is crucial, especially given increased cost and morbidity associated with the anesthesia requirements. While the types of interventions outlined above are being implemented at several facilities with large pediatric patient volume,^{1,14,16} additional research is needed to validate specific practices in pediatric RT and determine which are most effective.

While interventions can be useful for many children to reduce the need for sedation, it is important to determine which patients will be most amenable to this additional support. The use of a screening survey is a valuable tool for RT providers who wish to implement various practices discussed in this review. Screening can be particularly useful in RT facilities with limited resources dedicated to their pediatric population as screening will better direct resources to patients most likely to benefit. Screening can be used to stratify patients into three groups: 1) those likely to require sedation regardless of intervention, 2) those amenable to an intervention (ie, “gray zone”), or 3) those unlikely to require sedation regardless of intervention.³ Resources can then be targeted toward children in the “gray zone” since they are most likely to benefit from chosen interventions. Various pediatric RT studies describe use of a screening step as part of their intervention process for reducing sedation^{3,7,9,10} while others report specific success targeting patients in the “gray zone.”³ Many criteria characterize a child’s likelihood of requiring support to avoid sedation but common themes include the child’s ability to communicate, physical limitations, level of pain or anxiety, understanding and experience with medical treatment, ability to separate from caregivers, and various other developmental assessments.^{3,7,9,10} Additional research is needed to determine the criteria that

best stratify patients into these three categories.

It is recognized that RT facilities have different resources and patient populations. Therefore, we hope this review will serve as an outline of tools for centers to use in adopting an individualized approach to their pediatric patients.

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