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Development of Pediatric Emergency Protocols and Communication Plans in Pediatric Radiation Oncology: Multidisciplinary Core Competencies

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Abstract

Radiation therapy is an essential component of treatment for many pediatric cancers, yet the cost of maintaining a radiation facility at a dedicated pediatric center is often prohibitive. As a result, adult facilities treat pediatric patients where preparation for a pediatric emergency may be inadequate. The purpose of this quality improvement project was to develop a multidisciplinary emergency preparedness plan for a collaborative pediatric radiation oncology program at an adult community hospital with its partnering academic children's hospital. Using a cyclical process involving multidisciplinary collaboration that combines policy development, preparation, and team-building, the authors created the protocols and processes that would support the stabilization of a pediatric emergency and facilitate transfer to the partnering children's hospital. Further development of a communication plan outlines the flow of patient information through the multidisciplinary team during these transitions of care. Areas for future work include quantitative outcome measures to determine the effectiveness of the policies and procedures developed to prepare staff for pediatric emergencies. *(Pediatr Qual Saf 2017;2:e040; doi: 10.1097/pq9.0000000000000040; Published online August 18, 2017.)*

INTRODUCTION

Available Knowledge

Radiation therapy is a pivotal medical treatment for many pediatric oncology patients. Pediatric cancer remains a rare disease in the United States compared with the frequency of adult cancers, with pediatric cases accounting for only 1% of all new cancer diagnoses each year.[1] However, pediatric patients are distinct from adults in physiology, pathology, and treatment modalities, and therefore require health-care providers with pediatric expertise and training. Due to the high cost of building and maintaining a radiation facility, pediatric hospitals often contract with adult institutions to treat children. When pediatric programs are developed at adult institutions, the infrastructure of both the clinic and emergency department may lack the necessary resources and/or experience to adequately manage pediatric emergencies, making the transfer to a dedicated children's hospital (CH) inevitable. Thus, it is essential for pediatric radiation oncology programs at adult institutions to prepare for pediatric emergencies within their facilities as well as to coordinate with the collaborating pediatric institution to ensure safe and effective management of emergencies and transitions of care.

Rationale

Pediatric emergency response readiness includes attention to preparation and concern for patient safety necessary for both emergency departments and outpatient clinics. Definitive policy statements from national practice associations provide recommendations on pediatric readiness for emergency departments and pediatric primary care providers.[2,3] These include information on equipment, supplies, personnel, and training best suited to aid in a pediatric emergency. Although national endeavors over the last 20 years have greatly improved pediatric readiness, recent assessments have demonstrated a continued deficit in preparedness for pediatric emergencies.[4] Moreover, none of the literature published on pediatric

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readiness addresses pediatric clinics at primarily adult hospitals. Pediatric radiation oncology patients often spend a majority of time during radiation therapy in an adult institution, away from their primary pediatric team, and can require unique resources in an emergency. Therefore, establishing a collaborative program for emergency preparedness between the radiation facility and referring pediatric institution at the time of program development can reduce the risk of poor outcomes and improve confidence among families, staff, and stakeholders.

METHODS

Context

We established a pediatric radiation oncology program as a collaboration between an adult community hospital (ACH) and its partnering academic CH with a projected patient volume of 40 patients per year. The primary pediatric radiation oncology team, located at the ACH, consisted of a pediatric radiation oncologist (PRO), pediatric nurse practitioner (PNP), nurse (RN), nurse navigator, and child life specialist. The triad of the PRO, PNP, and RN was intentionally redundant with at least 2 of the personnel being present in the clinic while patients undergo radiation therapy. The PNP could serve in the provider or nurse capacity during an emergency in the absence of the third team member. A pediatric anesthesiologist from the CH was on site in the radiation oncology department during the treatment for patients under age 18, who required additional monitoring, and to serve as team leader in the event of an emergency. Stakeholders included hospital leadership, city representatives, and multidisciplinary teams from the collaborating institutions. Because the ACH lacked pediatric-specific emergency, surgical, and inpatient services, the planned transition of care to the nearby CH was predetermined to be the standard of care in an emergency situation. Pediatric transport from the CH transported inpatients requiring radiation to the ACH. The CH transport team remained on site during radiation treatments to facilitate quick transitions of care, communicate needs/changes in patient status to the CH, and decrease the number of handoffs on medically complex patients.

Intervention

In anticipation of receiving high-acuity pediatric oncology patients with the potential for acute illnesses and exacerbation of chronic illnesses, emergency guidelines about both the pediatric primary care setting and the emergency department supported the protocol development.[2,3] Core competencies surrounded 3 main elements: policy and protocols, team-building, and facility preparation.[5] A review process by a collaborative team (including representatives from radiation oncology, medical oncology, anesthesiology, and emergency medicine) was then cyclically used to reinform the 3 categories as needs were realized (Fig. 1). Likewise, a communication and multidisciplinary care model were diagramed to determine transitions of care across institutions and to further clarify roles and flow of information across hospital systems (Fig. 2).

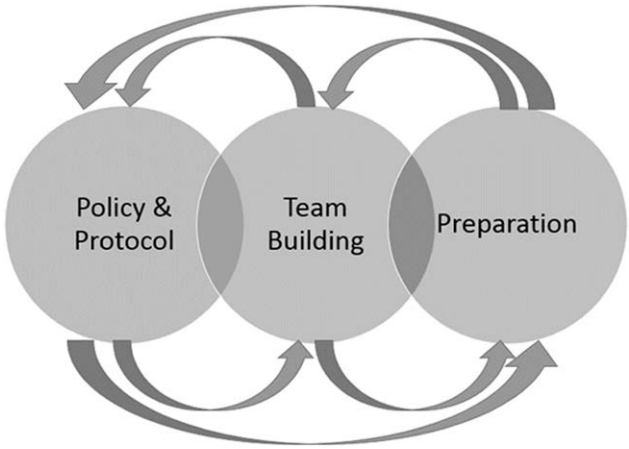

Fig. 1. Core competencies in pediatric emergency care model.

RESULTS

Protocols and Communication Plans

Seven protocols were developed to represent the overall categories of potential emergency events for pediatric oncology patients. The protocols included (1) code blue response in case of a pulseless or apneic child; (2) severe bleeding with suspected thrombocytopenia/inadequate coagulation; (3) neutropenia with fever; (4) altered mental status; (5) seizure; (6) respiratory distress; and (7) hypotensive shock caused by allergy, inadequate cardiac output, sepsis, or hypovolemia. Oncologic emergencies in which a patient needs radiation but is not currently located in the department, such as spinal cord compression, are handled through a different process. Recommendations from current literature, national guidelines, involved care providers, and preexisting institutional processes were used to build the protocols. Each protocol outlined recognition of the patient scenario and an initial assessment, a notification pathway to initiate the emergency response, medical management recommendations, and disposition with clinical care coordination. The roles of the multidisciplinary team members were delineated to prevent confusion, ensure prompt transfer of patient care to emergency services, and maintain evidence-based practices. Protocols underwent departmental review by radiation oncology, anesthesia, medical oncology, emergency department/transport, and hospital leadership from both institutions before policy adoption.

Communication plans were simultaneously created to facilitate transfer of care between campuses when emergency transport and/or medical services were required. The flow of patient information included both immediate communication between multiple health-care providers and the sharing of medical records between electronic

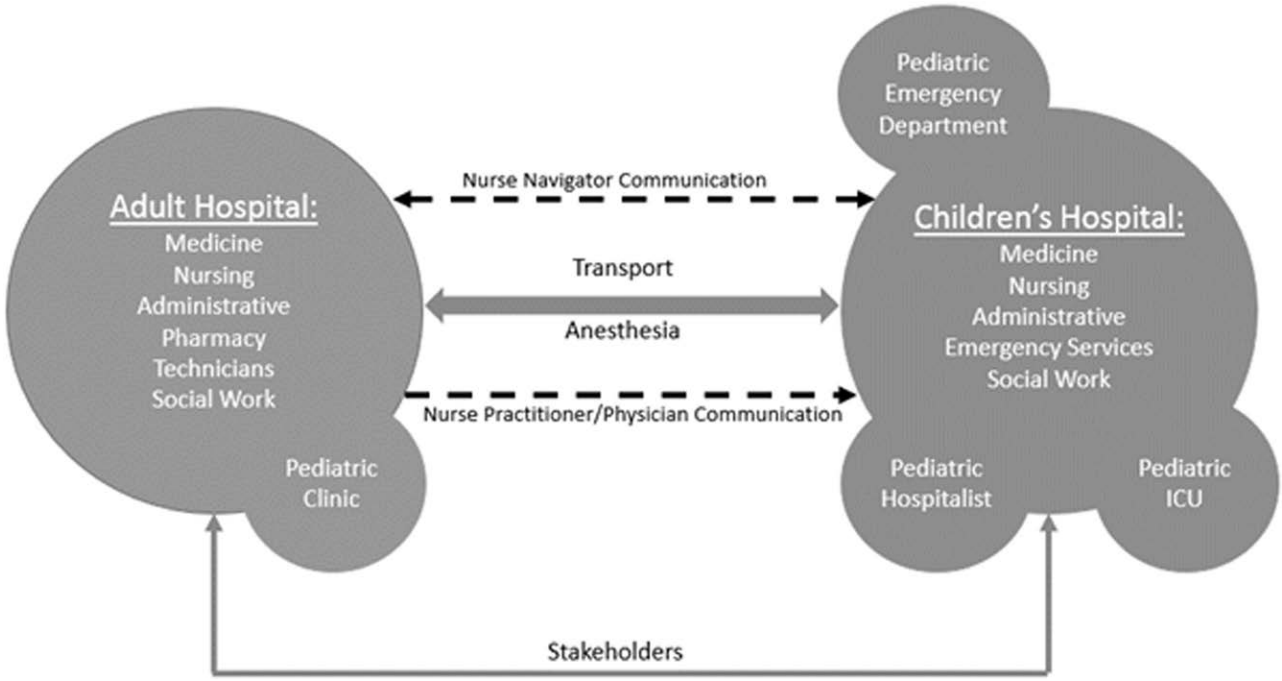

Fig. 2. Multidisciplinary care and communication model.

medical record systems. A situational algorithm was created based on a patient's disposition to home, inpatient, or emergency department and included a communication action plan in the Situation Background Action Response format (**see Appendix A, Supplemental Digital Content 1, *http://links.lww.com/PQ9/A16***).[6] The communication plan for handoffs initiated in the pediatric radiation oncology department was 2-fold: (1) Between the radiation team (PRO or PNP) and the receiving provider at the CH (inpatient, emergency department, or pediatric intensive care unit) via phone during the patient transfer and (2) the transfer of electronic medical records and from radiation oncology to the receiving unit facilitated by the nurse navigator.

Preparation

Pediatric preparedness required the procurement of specialized equipment, medications, and supplies suitable for pediatric patients.[2] Initial preparation included obtaining multiple pediatric sizes of airway management devices, vascular access and fluid management, and a pediatric code cart. A separate airway cart with color-coded, weight-based supplies was obtained to support the placement of an advanced airway in case of respiratory compromise. The ACH's pharmacy stocked common emergency medications in pediatric formulations and created an intravenous medication pump library with pediatric infusion recommendations and limits.

In addition to medications and supplies, the ACH facilities required access for emergency medical services. The radiation oncology department acquired dedicated ambulance parking, building access, and a handicap ramp for stretchers. Simulated walk-throughs took place with city fire department officials and emergency transport personnel. The walk-throughs verified the ability of these services to access the building, supply availability, and established a precedent for the emergency response.

Team-Building and Experiential Learning

The multidisciplinary team participated in a variety of team-building activities as educational opportunities (Table 1). Because the staff at the ACH had limited experience in pediatrics, we provided educational training sessions on child development and interaction as an

Table 1. Multidisciplinary Team Member Participation in Team-Building Activities

Team-Building and Experiential Learning Staff Participation						
Activity	**RN**	**NP**	**MD—Radiation Oncology**	**MD—Anesthesia**	**RT**	**Child Life**
Child development and interaction	X	X	X		X	X
PALS	X	X	X	X		
Sedation recovery and airway management	X	X		X		
Mock codes	X	X	X	X	X	X

NP, nurse practitioner; MD, medical doctor; RT, radiation therapist.

introduction to family-centered care. Clinical staff with practice licensure (PRO, RN, PNP) completed Pediatric Advanced Life Support (PALS) classes as a team and participated in department-specific scenarios to practice skills associated with PALS concepts. Nursing staff (RN, PNP) completed advanced training on sedation and airway management with pediatric anesthesiologists for 120 hours. Specific skills included bag mask ventilation, interventions for an oxygen desaturation, monitoring during anesthesia, and management of complications during anesthesia or recovery.

Mock codes synthesize the concepts of protocol development, preparation, and team building. Participation from physicians, nurses, and radiation therapy staff involved in the care of pediatric patients at the ACH was required. The mock codes allowed team members to familiarize themselves with the physical space, the location of supplies, and the algorithms from the emergency protocols. A PALS course instructor facilitated a series of 3 code scenarios using a child-sized mannequin capable of physiologic monitoring and lung sounds. A clinical team member from the CH was available by phone to mimic referral and transport. Qualitative feedback from the mock code revealed requests for additional training on pediatric assessment, deploying the emergency response, and team dynamics/roles.[7] We combined these requests in voluntary educational in-services that surrounded 3 main topics of concern: (1) recognizing a child in distress; (2) deploying the emergency response and CPR basics; and (3) team dynamics and locating supplies. Mock codes were then placed on a quarterly schedule to maintain competencies and skills associated with pediatric emergency preparedness.

DISCUSSION

Incorporating pediatric emergency preparedness into program development of a new clinic is especially important when pediatric patients are receiving health care services at a primarily adult institution. This preparation includes protocol development, preparation of the facility, and team-building. These 3 areas can be practically tested using mock codes to simulate patient scenarios and initiate emergency services to ensure an adequate and appropriate response. Multidisciplinary communication across campuses during emergency situations is especially important to plan to facilitate teamwork, reduce errors, and expedite transitions of care to the most suitable destination. The bidirectional arrows in Figure 2 represent the flow of communication/patient information. This duality of communication movement can help engender trust with stakeholders during program development, reduce errors, and yield effective and efficient transitions in patient care.

Limitations

Limits to this project include its development and implementation as a preparatory strategy before the arrival of any patient on the ACH campus. Emergency protocols and mock codes were based on expected patient situations but could not fully anticipate the breadth of possibilities in an emergency and should not involve actual patients. Therefore, it was not possible to ensure that supplies, procedures, and personnel fully met the needs of any and all pediatric emergencies.

Replication at New Facilities

The primarily theoretical nature of this quality improvement project is meant to serve as a framework for others to reproduce similar endeavors in their clinic setting. The need for emergency preparedness is not unique to pediatric radiation oncology, and these concepts translate to a variety of pediatric departments whose primary clinic setting is outside of a major pediatric institution or lacks emergency personnel. In replicating the work at other institutions, providers should realize that program development requires constant revision and returning to previous steps as noted in the endless cyclical arrows of Figure 1. Additionally, stakeholders should be invited to collaborate at the inception of pediatric emergency readiness development to build consensus rather than reactively problem-solving. These authors had an intimate knowledge of the processes and procedures at each institution before initiating the plan, which is essential to the workflow. Regular weekly meetings of 1 hour created accountability with ensuring the completion of tasks and forward momentum of the project. Aside from the cost of supplies and personnel salaries, pediatric emergency readiness should incur little to no increased costs to a program.

Concluding Summary

Emergency preparedness for pediatric patients cared for in primarily adult institutions is essential to facilitate rapid transition to appropriate pediatric care and reduce the risk of negative outcomes in an emergency. The process should start with protocol development that is supported by the current evidence-based literature. The readiness with appropriate supplies, medications, and staff training should follow before testing the process with mock codes. The addition of a multidisciplinary communication model and core competency diagram that allows for fluid movement across domains is novel to this project and can be built upon or adapted to the needs of any institution or department. The use of these models is most helpful for the strategic organization of ideas, roles, and flow of communication compared with program development with haphazard task completion. Future work should focus on both qualitative and quantitative outcome measures to ensure the adequate preparation of staff before opening the clinic.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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