

CHILDREN CENTRAL LINE COMPLICATIONS IN OSTEOSARCOMA PROTOCOL

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INTRODUCTION

One of the main advances in the quality of care of pediatric oncology patients was achieved with the advent of long-term central venous catheter (CVC). These devices permit the safe administration of intravenous chemotherapy, hydration and supportive care medications. Currently, long-term central venous catheter is considered the gold-standard of care in an oncology setting. However, its use exposes the patients to complications which can require early removal. The most common complications reported in the literature are infection mechanical and occlusion, bacteremia, tunnel exit-site infection and rupture. These complications are often under-appreciated. In order to prevent CVC complications, standard procedures must be followed by all team. The insertion and care of central venous catheters (CVC) requires a specialized CVC care and team, a multidisciplinary approach, involving medical oncologists/hematologists, nurses, interventional radiologists, surgeons and infectious disease specialists.

Since 2008, our patients with osteosarcoma were treated by chemotherapeutic regimen according to the Brazilian Osteosarcoma Treatment Group (GCBTO) protocol, which consists of Cisplatin 60 mg/m²/day, Doxorubicin 37.5 mg/m²/day and high-dose methotrexate 12 mg/m²/day (top dose 20 g) intravenous infusion.

Our objective is to describe different types of long-term central venous catheter during osteosarcoma's treatment GCBTO protocol with emphasis on its complications.

METHODS

The records of the patients who participated on the GCBTO 2006 protocol of the Brazilian Osteosarcoma Treatment Group (GCBTO), on National Cancer Institute (Instituto Nacional de Câncer - INCA Brazil/RJ), between February 2008 to December 2012, with follow up until 2015, were analyzed in a retrospective study. Inclusion criteria for enrollment in this protocol were: patients with typical imaging and histological features of primary high-grade osteosarcoma and age under 18 years.

Data collection included age at diagnosis, gender, location of primary tumors, stage, metastatic or localized disease, chemotherapy, surgical procedure (amputation or endoprosthesis), type of catheter (Peripherally Inserted Central Catheter - PICC, Hickman-Broviac or Totally Implantable Venous Access Ports - TIVAP), number of catheter/patient and types of complications. No temporary polyurethane catheter was included in this analysis.

Data were coded and analyzed in Excel 2013 and biostat 5.1, using the chi square test (X²), considering p<0.005 to statistical significance.

RESULTS

Ninety patients were treated by the GCBTO protocol, with histological confirmation of osteosarcoma (OS). In this group 56.7% were boys and 43.3% were girls, with no gender significance. The peak incidence age was 13 to 18 years (53/90), ranging from 5 to 18 years, median 10 years. Metastasis at diagnosis was present in 56.7% (51/90 patients).

The most common central venous catheter was PICC representing 64,5% (58/90) of patients and Hickman-Broviac or TIVAP, 42,5% (32/90). The mean lifetime of all catheters was 324 days (median 223 days, range 2-1802 days). The mean PICC lifetime was 221 days, while Hickman-Broviac and TIVAP were 456 and 568 days, respectively. The patients who initially underwent PICC implantation had greater need to another catheter to finalize chemotherapy than those with Hickman and TIVAP (X² = 23.5; GL = 2, p<0.0001). The former with greater number of complications representing 60% (54/90). PICC was associated with more complications (46/90), with suspected infections the most common cause of PICC removal in 51.1%, although *S.aureus* and *S.epidermidis* was isolated in only seven cases. The second cause of PICC removal was catheter extrusion (12/46), followed by catheter fracture (8/46), luminal obstruction (3/46) and thrombosis (1/46).

Moreover, patients with Hickman-Broviac and TIVAP had fewer complications (8/90): suspected infection (5/8), thrombosis (2/8) and obstruction (1/8). In this type of catheter, two had documented infection through catheter tip culture and blood culture. (Table 2)

Table 1: Epidemiological aspects, types of catheter and complications in pediatric oncology GBTO treatment.

Complication	Catheter type						TOTAL
	PICC		HICKMAN-BROVIAC		TIVAP		
	N	%	N	%	N	%	
Catheter Change*	46	85,2	05	9,3	03	5,5	54
Infection	22	47	03	11	02	08	27
Thrombosis	01	33	01	33	01	33	03
Extrusion	12	100	00	00	00	00	12
Fracture	08	100	00	00	00	00	08
Obstruction	03	75	01	25	00	00	04
Total	58	64,4	16	17,7	16	17,7	90

*p<0,0001

Table 2: Microorganisms species related to central line infections in pediatric oncology GBTO treatment.

Microorganisms	Catheter type						TOTAL
	PICC		Hickman-Broviac		TIVAP		
	n	%	n	%	n	%	
<i>Staphylococcus aureus</i>	04	44	01	33	-	-	05
<i>Staphylococcus epidermidis</i>	02	22	01	33	-	-	03
<i>Arthrobacter sp.</i>	01	11	-	-	-	-	01
<i>Rhodotorula mucilaginosa</i>	01	11	-	-	-	-	01
<i>Candida albicans</i>	01	11	-	-	-	-	01
<i>Burkholderia cepacia</i>	-	-	01	33	-	-	01
Total	09	100	03	100	-	-	12

DISCUSSION

Central venous catheters (CVCs) are widely used for long-term venous access in children with malignancies. In our institution PICC was more available than other long-term central venous catheter, and was the first implanted device in the majority of patients.

PICC was associated with more complications and a shorter lifetime (221 days), and infections and obstruction were the most frequent complications, according to the literature. The shorter lifetime might be influenced by multifactorial aspects as social economic status, high-dose chemotherapy, the quality of care and/or facility for its removal.

CONCLUSION

Rational long term catheter use in pediatric oncology is safe and provides a good adhesion to treatment. During cancer treatment, we should consider earlier indication of Hickman-Broviac and TIVAP.

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