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RESEARCH ARTICLE

PEDIATRIC CARDIAC CATHETERIZATION: EXPERIENCE OF A SUDANESE CENTRE

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ABSTRACT

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Pediatric cardiac catheterization is an advance technology that permits diagnosis and treatment of cardiac problems among children as well as congenital cardiac defects. It can be prescribed for all age groups and developmental stages to evaluate disease progression, regression and patients' response to therapy. Although it gives a great chance for evaluating children conditions and treating them, but like other invasive procedures it possesses adverse effects. Complications of cardiac catheterization are more prevalent among young age groups, children underwent long time procedure, using more contrast or dye, therapeutic procedure and the age of the client at the time of the procedure.

INTRODUCTION

Cardiac catheterization is a procedure in which a fine tube is passed into the heart chambers through a blood vessel. It is classified in two classes either diagnostic type or interventional and therapeutic type (Nadhem, 2016). In 1947 Bing started to describe pediatric cardiac catheterization for diagnostic purposes. However therapeutic catheterization was started to be used for children in 1968 by using balloon atrial septostomy, this technology is now used to treat many conditions among children like patent ductus arteriosus, ventricular septal defects, atrial septal defect, valves and vessels stenosis. Children underwent this technology need to be cared by dedicated team in order to optimize the benefits of care and treatment (Philip, 2011). Cardiac catheterization is regarded as a safe invasive procedure. However like any invasive procedure it possesses some risks and complications that may happen throughout the procedure steps (Murat Muhtar Yilmaze, 2012). It is shifted from diagnostic procedure among children with congenital heart disease to a therapeutic model due to advancement catheterization technologies, this shift increases the therapeutic options but unfortunately associated with risks and complications which are reported in 4%-10% of the procedures and these risks are found to be increased in infant groups so children need to be treated by experienced team of anesthetists, pediatricians and nursing staff (Odegard, 2014).

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Objectives

The aim of this study was to analyze situation of pediatric cardiac catheterization in Sudan Heart Centre (SHC) in the first 6years of its establishment with regard to types of pediatric cardiac catheterization done for children, prevalence of complications among children underwent cardiac catheterization and distribution of procedures by types among children in different age groups.

MATERIALS AND METHODS

A retrospective design was used to review files of pediatric patients from the year 2006 back to 2001 when the first pediatric cardiac catheterization was done in SHC.

Study setting: SHC is a specialized centre in cardiology services lies in Arkawet in Khartoum city ,it starts working in February 2000 and the first pediatric cardiac catheterization was done on the second day of march 2000 which is a diagnostic one.

Study units: they are the medical records or files of pediatric patients who underwent cardiac catheterization in the target period of time.

Sampling technique and sample size: A total of 307 files were reviewed consecutively for the purpose of the study.

Data collection tool and technique: Data were collected using review sheet which was developed by the researcher for the purpose of the study, this review sheet composed of four sections the first for the type of catheterization, the second for the sex of child, the third for the age group of the child and the last for prevalence of complications among children underwent cardiac catheterization.

Data analysis: data were coded and analyzed by excel 2010 and electronic chi square calculator, presented in figures and tables, significance was tested using chi square and the P.value was accepted when it is less than 0.05.

Ethical considerations: an agreement was taken from the general manager of SHC and the head department of nursing and the statistical department, all these formalities was done before starting data collection.

RESULTS

Fig. 1 showed that the highest number of diagnostic cardiac catheterization was done to diagnose problems among adolescent female 43 (23.75 %).

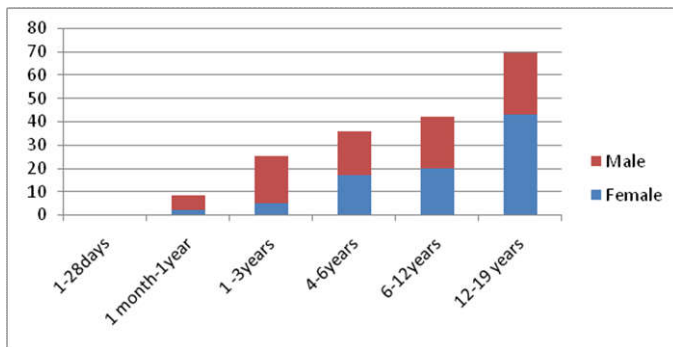


Fig. 1. Distribution of diagnostic cardiac catheterization by age groups (n=181)

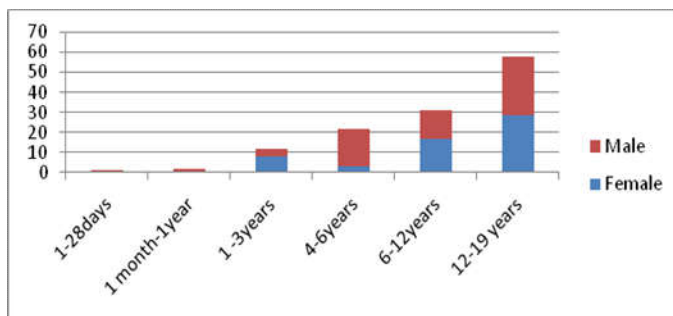


Fig. 2. Distribution of therapeutic cardiac catheterization by age groups (n=126)

Fig. 2. Showed that the highest requested number of therapeutic cardiac catheterization is done for adolescent male and female 29 (23.01%)

Table 1. Sex by age among children underwent diagnostic cardiac catheterization (n=181)

Sex/Age	0-5years	6-19 years	Total
Female	24	63	87
Male	45	49	94
Total	69	112	181

Chi square statistics is 7.8824, the p value is 0.04992 and the result is significant.

Table 2. Sex by age among children underwent therapeutic cardiac catheterization(n=126)

Sex/Age	0-5years	6-19 years	Total
Female	11	46	57
Male	26	43	69
Total	37	89	126

Chi square statistics is 0.0855, the p value is 0.024127 and the result is significant

Table 3. Type of cardiac catheterization by prevalence of complications (n =307)

Type/complications	Yes	No	Total
Diagnostic	0	181	181
Therapeutic	2(1.58%)	124	126
Total	2(1.58%)	305	307

Chi square statistics is 0.8221the p value is 0.36457 and the result is not significant

DISCUSSION

Pediatric cardiac catheterization started to be requested to diagnose congenital heart disease in 70 years ago according to (Philip, 2011). It associated with risks, although these risks declined but still there are some complications with this procedure (Thomas, 2015). As it plays a significant role in diagnosing and treating children of various heart diseases, pediatric cardiac catheterization should be carefully requested because risks and complications were found to be highly prevalent (Maria Jesus del Cerro, 2016). Among 307 pediatric cardiac catheterization done in SHC, 181(58.95%) were diagnostic and 126(41.04%) were therapeutic, but (Murat Muhtar Yilmaze, 2012), found that (82%) were diagnostic and 18% were interventional procedures and the overall estimation of risks is 6.2%. According to (Bahram Pishgoo, 2017), the prevalence of vascular complications is 7.3% while death is found to be 0.2%. The current study revealed no complications with diagnostic catheterization and the overall rate of complications and therapeutic catheterization complications is 0.65% and 1.58% respectively. This findings disagreed with (Koeun Lee, 2016) where the overall complication rate was 16.2% the diagnostic catheterization complications are 14.4 % and 16.4% for therapeutic one (Lisa Bergersen, 2017), found that the overall adverse event rate was 12.2%. However, these complications can be prevented by proper selection of patients and a thorough preoperative management (Murat Muhtar Yilmaze, 2012). According to literature (Safaa Husein Ali, 2016) and (Yoshiki Mori, 2010), factors that put the patients under the risk of developing complications are as follow: younger age children, urgent procedure, long time procedure or long duration, using more contrast dye material, pulmonary hypertension, therapeutic procedures and the age of the patient at the time of the procedure (Murat Muhtar Yilmaze, 2012; Bahram Pishgoo, 2017 and Koeun Lee, 2016) stated distribution of procedures and complications among children associated with age groups.

Conclusion

This study concluded that SHC provides diagnostic and therapeutic cardiac catheterization, the prevalence rate of complication among children underwent both types of cardiac catheterization is 0.65%, diagnostic cardiac catheterization is more prevalent among female children above five years old it is found to be 43 cases (23.75 %) and therapeutic cardiac

catheterization is more prevalent among the same age group of male and female children is 29 cases(23.01%).

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