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2024
https://hdl.handle.net/10539/37848

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ABSTRACT

Electrocardiographic features and Characteristics of Pericardial Disease in Children

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Introduction
There is little information regarding the aetiology, diagnosis and outcomes of pericardial disease in children on the African continent. The diagnosis is made easy using echocardiography, but it is not always available in a resource-limited setting. The electrocardiogram (ECG) is an inexpensive and easily available tool that can be used to detect pericardial disease, but little data is available regarding its use in children. This study reports the characteristics of pericardial disease in children and their ECG features in a South African peri-urban setting.

Methods
This retrospective descriptive study was conducted at a tertiary level hospital in Johannesburg, South Africa. The paediatric cardiology database was searched to identify all children with pericardial effusions from 1st January 1993 to 30th April 2019. Only patients that needed procedures or surgical intervention were selected for the study cohort, as it was expected that they would have ECGs available as part of their pre-procedure assessments. Available ECGs were collected and analysed for abnormalities. Other data such as age at presentation, sex, Human Immunodeficiency Virus (HIV) status, tuberculosis (TB) status, medications, pericardial fluid characteristics, details of pericardial surgical intervention and clinical outcome was also sourced from patient records and analysed. Basic descriptive statistics, such as percentages and frequencies was used for data interpretation.

Results
Over the 26-year period, 724 cases of echo-proven PEs were identified. There were 79 patients who underwent interventions, which comprised the study cohort. Seventy-eight percent were over 5 years of age and the majority had large pericardial effusions. Infectious causes predominated, of which TB was the most common (60%). Forty-five percent were documented as HIV positive. The most common procedure performed was the insertion of a pericardial drain. Fifty-four percent of patients had resolution on follow-up, 4% had disease recurrence, 14% of the cohort died and 24% had unknown outcomes. The predominant ECG features in the 25 ECGs that were legible were those of sub-acute or chronic pericarditis, showing abnormal T-waves in 96% and sinus tachycardia in 80%. Other abnormalities were: decreased chest lead QRS voltages (52%), PR segment depression (48%) and decreased limb lead QRS voltage (40%), Less common findings were

electrical alternans (28%), ST segment elevation (12%) and ‘Spodick’s sign’ (8%).

Conclusions

The study showed that infectious causes, in particular TB, are the predominant causes of paediatric pericardial disease in South Africa. The majority of children, however, had complete resolution of their pericardial disease despite the need for invasive interventions. Although few ECGs were located and legible, all showed abnormalities with the majority displaying features of sub-acute or chronic pericarditis, suggesting that most children undergoing invasive treatment have later stages of pericardial disease. The few ECGs that were available for interpretation constitute a notable study limitation, but provide a basis for future studies on ECG changes in children with pericardial disease.