

## Electrocardiogram (ECG), In-Patients, Jakaya Kikwete Cardiac Institute (JKCI)

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### ABSTRACT

**Background:** Cardiac pacing has been used in the treatment of bradyarrhythmia's since 1958. It is safe and efficient therapy that improves prognosis and quality of life. This clinical audit aimed at auditing In-person office follow-up practice at JKCI to monitor patients with pacemakers, ICD and CRT devices from November 2013 to February 2019.

**Methods:** This is the retrospective clinical audit for patients having CIEDs at JKCI implanted between November 2013 and December 2018 and were checked whether their follow-up practice abide to recommended guidelines.

**Results:** About 146 patients were included in this clinical audit, after excluding those patients whose their files were missed (n=40) as well as those whose files had no desired information (n=6). Female patients were 51% (n=75), dominant age group was between 60 to 79 years (59%, n=86), about 51% (n=74) of patients came from regions apart from Dar es Salaam and Pwani and pacemaker was dominant device (86%, n=125). For in-patient follow-up, surgical wound inspection and control chest X-ray were 83% and 60% done respectively, which was below audit set standard. No data were available for surgical site inspection and control chest X-ray after one month follow-up. Follow-up visit for device interrogations, in-hospital, after one, three and six months were 79%, 47%, 32% and 27% respectively which also were below set standard.

**Conclusion:** Surgical site inspection, control chest X-ray and device interrogation follow-up practice all were below the clinical audit set standard at JKCI.

### Keywords

Electrocardiogram (ECG), In-Patients, Jakaya Kikwete Cardiac Institute (JKCI).

### Background

Cardiac pacing has been used in the treatment of bradyarrhythmia's since 1958 [1]. It is safe and efficient therapy that improves prognosis and quality of life, especially in the first year of implantation [2].

Cardiovascular implantable electronic devices (CIEDs) include

the pacemaker (PM), implantable cardioverter-defibrillator (ICD), cardiac resynchronization therapy (CRT), implantable loop recorder (ILR) and implantable cardiovascular monitor (ICM) are used for this purpose [3]. For the purpose of this clinical audit and capability of facility audited the CIEDs performed and followed are pacemakers, ICD and CRT devices. Having CIED in place, a regular device checkups are needed to see the level of performance and to change device setting if needed [4]. Within 24 hours after implantation and before discharge, a careful evaluation on patient's clinical condition and CIED function should be performed.

In general, indications of CIEDs are symptomatic bradycardia and atrioventricular blocks (Pacemaker), cardiac arrest and threatening ventricular arrhythmias (ICD) and heart failure (CRT).

The aim of pacemaker follow up is to maintain pacemaker function and adjust according to the patient need, early detection of problems and to monitor battery charge status [4]. At JKCI CIEDs implantation started in November 2013, and up to December 2018, about 193 CIEDs installation procedures were performed.

This clinical audit aimed at auditing In-person office follow-up practice at JKCI to monitor the patients with pacemakers, ICD and CRT devices from November, 2013 to December 2018.

## Methodology

### Study design

It is a retrospective clinical audit of patients having cardiac implantable electronic devices at JKCI.

### Study population

All patients with CIEDs attending JKCI clinic during the study period.

### Study site

This audit was conducted at Jakaya Kikwete Cardiac Institute in Muhimbili National Hospital.

### Inclusion criteria

Patients with pacemakers, ICD and CRT devices installed between November 2013 and December 2018.

### Sampling technique and Sample size

All patients with CIEDs installed at JKCI from November 2013 to December 2018.

### Data source and collection

Patient information was taken from individual paper based file and electronic hospital database (Medi-Pro). Then, information gathered and transferred to structured questionnaire eventually to Microsoft excel.

### Data analysis

Microsoft Excel (spread sheet) was used for data analysis.

### Audit permission

Permission to conduct this audit was provided from the JKCI administration.

### Audit set standard

In-person office follow-up below **90%** for the **in-hospital** assessment, below **80%** for the **first visit**, below **70%** for **second visit** and below **60%** for the **third visit** were considered as below average.

These values were set standard for this clinical audit.

## Results

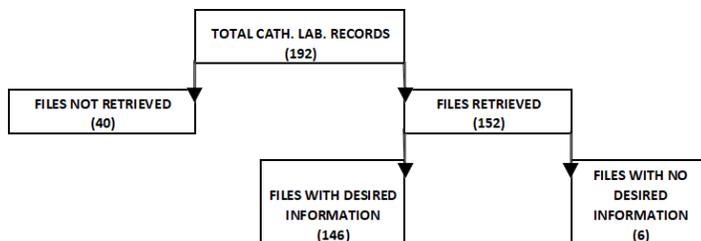


Figure 1: Flow chart.

A total of 192 patients were installed one of the CIEDS device during the period from November 2013 and December 2018. Among them 152 patients their paper based files were seen. 146 out of 152 files had desired information for this clinical audit.

SEX	FREQUENCY	PERCENTAGE
F	75	51%
M	71	49%
<b>TOTAL</b>	<b>146</b>	<b>100%</b>

AGE DISTRIBUTION	FREQUENCY	PERCENTAGE
<40	3	2%
40-59	26	18%
60-79	86	59%
≥ 80	31	21%
<b>TOTAL</b>	<b>146</b>	<b>100%</b>

DEVICE TYPE	FREQUENCY	PERCENTAGE
PM	125	86%
ICD	8	5%
CRT	13	9%
<b>TOTAL</b>	<b>146</b>	<b>100%</b>

Table 3: Demographic data and device type.

Female gender were 51% and age group between 60-79 years were majority (59%). 86% of patients had permanent pacemaker installed.

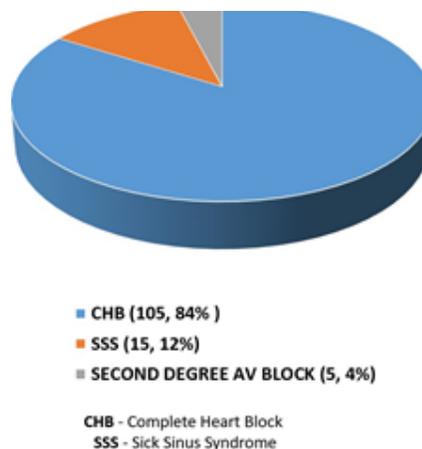
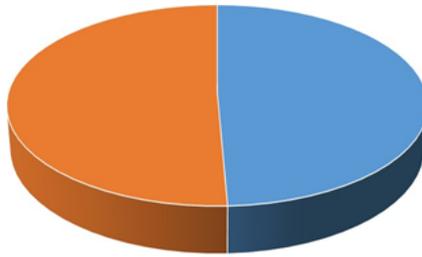


Figure 2: Distribution by pacemaker indications.

Around 84% were installed pacemaker due to complete heart block



■ DAR AND PWANI (72, 49%)  
 ■ OTHER REGIONS (74, 51%)

Figure 3: Distribution by regions.

Most of the patients came from Dar es Salaam and Pwani regions

	INPATIENT				CUTOFF VALUE
	DONE	%	NOT DONE	%	
SURGICAL WOUND INSPECTION	121	83%	25	17%	< 90%
CONTROL CXR	88	60%	58	40%	< 90%

	1 MONTH AFTER DEVICE INSTALLATION				CUTOFF VALUE
	DONE	%	NOT DONE	%	
SURGICAL WOUND INSPECTION	Information				< 80%
CONTROL CXR	not available				< 80%

Table 4: Wound inspection and control chest X-ray.

During inpatient follow-up, around 83% of the patients their wound were examined and only 60% of the patients had chest X-ray. There is no information in computer database regarding with wound inspection and chest X-ray after one month patient returned to clinic.

	DONE	%	NOT DONE	%	TOTAL	CUTOFF VALUE
IN-HOSPITAL	116	79%	30	21%	146	< 90%
AFTER 1 MONTH	55	47%	62	53%	117	< 80%
AFTER 3 MONTHS	34	32%	73	68%	107	< 70%
AFTER 6 MONTHS	25	27%	67	73%	92	< 60%

Table 5: Device interrogation.

Only 79% of patients their devices were interrogated during hospital stay, which is below set standard ( $\geq 90\%$ ). All three OPD visits (1, 3, and 6 months after device interrogation) which were followed in this audit, devices interrogation found to be below the set standards (47%, 32% and 27% respectively).

Patients coming from other regions apart from Dar es Salaam and Pwani, their percentage of device interrogation were higher during OPD visits.

#### DEVICE INTERROGATION (DAR AND PWANI)

	DONE	%	NOT DONE	%	TOTAL	CUTOFF VALUE
IN-HOSPITAL	60	83%	12	17%	72	< 90%
AFTER 1 MONTH	18	36%	32	44%	50	< 80%
AFTER 3 MONTHS	14	30%	32	70%	46	< 70%
AFTER 6 MONTHS	9	24%	28	76%	37	< 60%

#### DEVICE INTERROGATION (OTHER REGIONS)

	DONE	%	NOT DONE	%	TOTAL	CUTOFF VALUE
IN-HOSPITAL	56	76%	18	24%	74	< 90%
AFTER 1 MONTH	37	55%	30	45%	67	< 80%
AFTER 3 MONTHS	20	33%	41	67%	61	< 70%
AFTER 6 MONTHS	16	29%	39	71%	55	< 60%

Table 6: Comparison in device interrogation between patient coming from Dar es Salaam/Pwani and Other regions of Tanzania.

### Discussion and Conclusion

Control CXR and surgical site inspection during initial days after device installation is very important.<sup>10</sup>

In this clinical audit we found about 83% (target  $\geq 90\%$ ) patients their wound were inspected and about 60% (target  $\geq 90\%$ ) control chest X-ray were taken during In-hospital stay which was below our set standards. These low percentages imply that, there was some delay in recognizing device complications which might lead to poor outcome to these patients.

At 1 month after installation, no data captured regarding the control chest X-ray and surgical site inspection from computer database (Medi-Pro data base). This probably because clinicians were not documenting services which their providing to patients in the computer database.

When device interrogation followed for first three OPD visits, all percentages are low compared to set targets despite of the fact that, these patients showed good OPD attendance as their average of days attended are above 10 visits. Hence, the low percentages for the device interrogation might be due to poor documentation.

Low percentages of device interrogation might not be contributed by remoteness from Dar es Salaam. As clients stayed outside the Dar es Salaam and Pwani regions have little bit higher percentages (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> visits) compared to those coming from Dar es Salaam and Pwani regions.

### Recommendation

1. Surgical site inspection, control CXR and device interrogation should be done to every patient before hospital discharge
2. Improve documentation both in hard copy files during In-hospital stay as well as in the computer data base for OPD visits (Medi Pro)
3. For the patients who failed to attend clinic, at least they can have 12 ECG lead strip from nearby health facility and transmit it to JKCI for interpretation

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