ORIGINAL PAPER

Joint replacement in Zambia: a review of Hip & Knee Replacement surgery done at the Zambian-Italian Orthopaedic Hospital

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ABSTRACT

Background: Incidence of major joint replacement surgery is on the rise in Africa but this trend has not been matched by proper audits in the form of National Joint Registries.

Objective: This paper presents the short-term findings from a joint replacement register started at the Zambian-Italian Orthopaedic Hospital (ZIOH) in Lusaka and compares the variables entered in this register with those captured in the Malawian National Joint Register for purposes of synchronizing these in the near future in the East, Central and Southern African region .

Methods: Data captured by the different variables entered into the Joint Register covering the pre-op, intra-op and post-op period of all total hip and knee replacement surgery done at the ZIOH from 1998 to 2010 was entered into a spreadsheet after verification with individual patient medical records. This was then imported into spss for analysis yielding the following results.

Results: 44 total hips and seven total knee replacement operations were done on 46 patients, 59% of which were female and 41% male. The average age was 58 years. The HIV sero-status of 86.3% was unknown. 36 (70.6%) of the patients had primary osteoarthritis as the diagnosis with pain and joint stiffness being the indication for surgery. Three consultants and one senior registrar did the operations mainly using the Hardinge approach to the hip. 43 (84.3%) were primary Total Hip replacement with only one revision. The 28mm hip head size was the commonest fitted with most patients, 48 (94.1%) being functionally mobile at six weeks post operation.

Conclusion: This audit clearly shows a rising trend of major joint replacement over the years and highlights the gaps in variables entered into the ZIOH joint register such as HIV status. It also helps us recognize the need for setting up a National Joint Register that is comparable to others that have been set up in the region such as is the case in Malawi which is key in improving orthopaedic training and patient care.

INTRODUCTION

Lubenga et al [1] presents the current epidemiologic increase in joint replacement surgery in Africa[2], the fact that there is a difference in age and indication for joint replacement surgery between patients in developed and developing world and stresses the need for proper audits of joint replacement surgery in Africa bearing in mind that many new centers with variable standards of care and training of the surgeons are performing these procedures. In their paper, they present very informative short term findings from a National Joint Registry they pioneered in Malawi that could serve as a form of national audit in other countries making up the College of Surgeons of East Central and Southern

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Africa (COSECSA) sub-region. Zambia being a neighboring country to Malawi is yet to establish such a registry but patient audit information does exist as will be presented in this paper. While we acknowledge the need to establish a National Joint Registry for Zambia and other countries in the sub-region, we are mindful of the fact that for such a registry to benefit the whole sub-region, there will be need to synchronizing the variables entered into the registry so that the same information is captured for ease of comparison and interpretation, monitoring and evaluation. This paper presents the short term findings of a joint replacement surgery registry for the Zambian-Italian Orthopaedic Hospital (ZIOH), whose variables differ from the Malawian version that could in-put into a National Joint Registry for Zambia. Such a national registry is important not only because it will help us compare, interpret, monitor and evaluate joint replacement surgery but it will also help us establish potential complications such as the amount of risk for deep infections of implants in patients with HIV in the long term as predicted by Jellis.[3] It will also help us establish if there is still a need to remove trauma implants soon after union of a fracture in HIV positive patients if infection occurs as suggested by Harrison, Lewis and Lavy[4] in the currents age of widespread HAART as observed by Lubenga et al.[1] Zambia has scaled up access to HAART with 68 percent[5] of adults living with HIV being on treatment out of a total of 1,100,000 people currently living with HIV[6] and of which 416,533 were in need of ART as at December 2009.[7] Adult HIV prevalence rates in Zambia currently stand at 16 percent[8] according to the Zambia Demographic and Health Survey (ZDHS) report of 2007. HAART in HIV positive patients in Zambia is started at $<200 \times 10^6$/l CD4 cell counts although there has been a proposal to commence HAART at higher[9] CD4 counts which will see more persons on HAART. Most of the centers performing joint replacement surgery in Zambia are capable of patient follow-up with CD4 cell counts and viral load monitoring for HIV positive patients on HAART undergoing joint replacement surgery. The Zambian public health sector has also adopted the Direct Testing and Care (DCT) Policy with the opt out option at all health facilities to try capture more of those with HIV so they enter the HAART program with a high enough CD4 cell count for good clinical outcomes and secondary prevention of HIV transmission. Thus it is mandatory for persons undergoing major orthopaedic surgery, such as joint replacement, now in the Zambian public health sector to have HIV routinely tested for purposes of comprehensive care and infection prevention. A national joint registry will gather all this information and enable us know the long-term outcomes of HIV-positive patients who have undergone joint replacement.

PATIENTS AND METHODS

This book-registry was started in the year 1998 and recorded information from all patients undergoing joint replacement surgery (total hip and total knee replacement) at the Zambian-Italian Orthopaedic Hospital (ZIOH), a specialised, urban based orthopaedic training center. Patients were recorded into the registry using the specific identification numbers that were also hospital medical file numbers. These files were accessed by the research team for purposes of verifying the data that had been entered into the registry and for clarification/corrections when the registry data was not clear or missing.

Variables collected from the registry included the following.

1. Patient medical record file number
2. Patient age (in years)
3. Patient gender (Female/Male)
4. Patient weight (in Kg)
5. Patient Haemoglobin level (Hb in g/dl)
6. ESR (in mm/hr)
7. Year of operation
8. Diagnosis
9. Indication for surgery
10. Body site
11. Procedure
12. Approach
13. Operation finding
14. Prosthetic size (head or cup)
15. Anaesthesia
16. Co-morbidity

17. In-patient physiotherapy sessions
18. Operating surgeon
19. Patients HIV status
20. 1st outpatient review (2/52) status
21. 3nd outpatient review (6/52) status

At the out-patient reviews, possible short-term complications were ruled out and only what was present was recorded. These included mortality, infection, dislocation, revision, peri-operative fracture, neurologic injury, thrombo-embolic disease, pain and physical function (mobility). The register did not record other patient factors such as Race/Ethnicity and Social Economic Status (SES) that are known be among predictors[10] of short-term outcomes/complications in total hip replacement surgery. Only Total Hip and Total Knee replacement surgery cases were included in this study. All hemi-arthroplasty patients were excluded. Collected data was then entered into a spread sheet (Excel) and imported into SPSS for analysis.

RESULTS

Table 1. Distribution of the patient demographic and clinical pre-op variables, *n = 51*

Variable	*f*	*% of total*
· *Gender*		
Female	30	58.8
Male	21	41.2
· *Subject Age (in years)*		
Mean	58.4	-
Minimum age	23.0	-
Maximum age	82.0	-
· *Patient weight (in Kg)*		
Mean	70.4	-
Minimum	40.0	-
Maximum	100.0	-
· *Haemoglobin levels (g/dl)*		
Mean	12.8	-
Minimum	08.0	-
Maximum	16.0	-
· *Erythrocyte Sedimentation Rate (ESR in mm/h)*		
Mean	38.0	-
M inimum	01.0	-
Maximum	108.0	-
· *HIV Status*		
+Ve	02	3.9
-Ve	05	9.8
Unknown	44	86.3

Figure 1. Distribution of patient diagnosis. n = 51

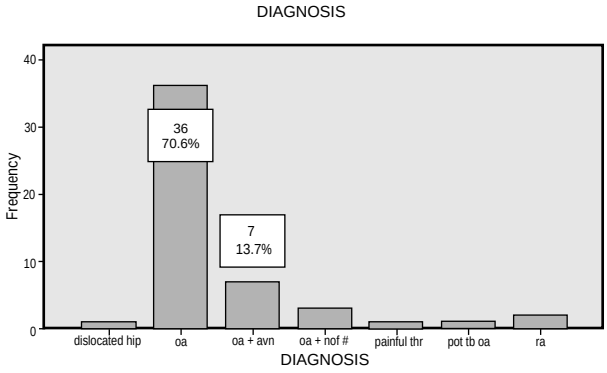
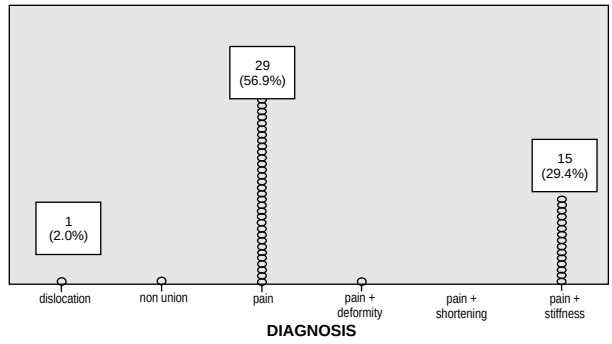


Figure 2. Distribution of Indications for Joint Replacement surgery. n = 51



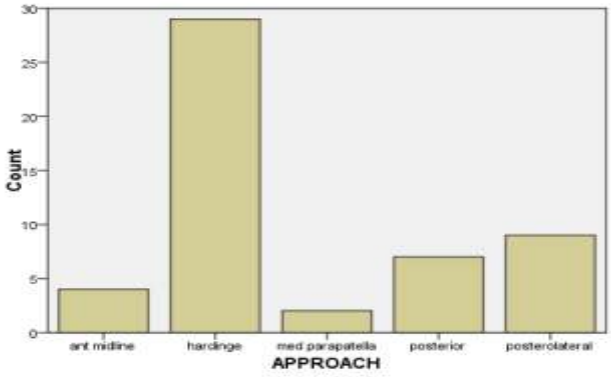
Unilateral hip osteoarthritis 29 (76.5%) was the commonest diagnosis while pain 29 (56.9%) and pain with joint stiffness 15 (29.4%) was the commonest indication for surgery as shown by figures 1 & 2.

Table 2. Distribution of operation related variables (n = 51)

Variable	*f*	*% of total*
· *Affected joint*		
Lt. Hip	20	39.3
Rt. Hip	24	47.1
Lt. Kn ee	03	05.9
Rt. Knee	04	07.8
· *Procedures done*		
THR *(primary)*	43	84.3
THR *(Revision)*	01	02.0
TKR	07	13.7
· *Anaesthesia*		
GA	24	47.1
Spinal	27	52.9
· *Surgeons*		
C1	21	41.2
C2	23	45.1
C3	06	11.8
R	01	02.0
· *Co -morbidity*		
Diabetic & Hypertensive	03	05.9
Hypertensive	07	13.7
Previous THR	03	05.9
Penicillin allergy	01	02.0
Rheumatoid arthritis	02	03.9
TB	01	02.0
SCD	01	02.0
Fused lt. Hip	01	02.0
HIV +	02	03.9
Nil	30	58.7

AVN = Avascular Necrosis. THR = Total Hip Replacement.TKR = Total Knee Replacement, C1 = Consultant 1. C2 = Consultant 2, C3 = Consultant 3. R = Registrar, SCD = Sickle Cell Disease. GA = General Anaesthesia.

Figure 4. Surgical Approach used in the joint replacement surgery. n = 51



The direct lateral approach to the hip (Hardinge approach) was the commonest approach to the hip in total hip replacement surgery 29 (56.9%) while the knee what approached through the midline or medial parapatella incisions.

The 28mm Femoral Head component was the commonest used 26 (51.6%) in hip replacement surgery although this data was missing for a few of the patients 9 (17.6%).

Figure 5. Distribution of prosthetic implant size used in hip replacement surgery. n = 51

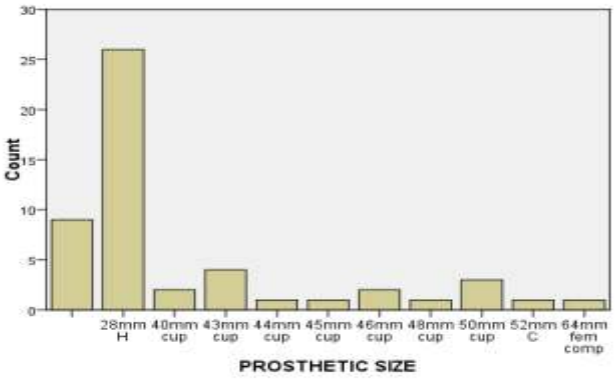
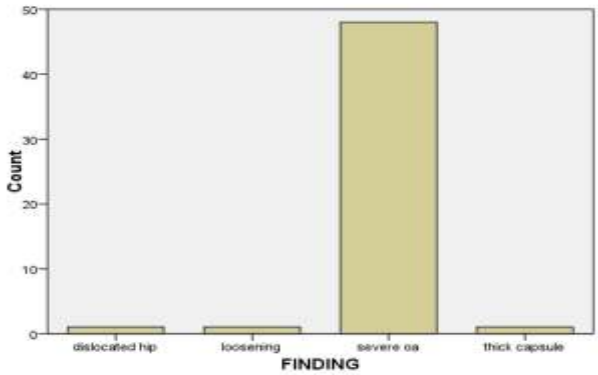
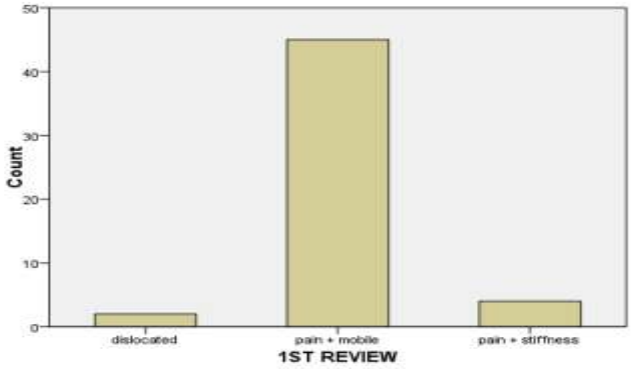


Figure 6. Distribution of intra-op finding. n = 51



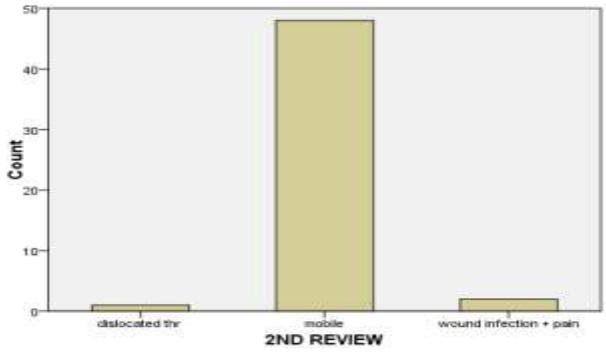
Osteoarthritis 48 (94.1%) was the commonest intra-op finding but in two situations that had required revision surgery, loosening and implant dislocation was found.

Figure 7. Distribution of findings at 2 weeks post-op review. n = 51



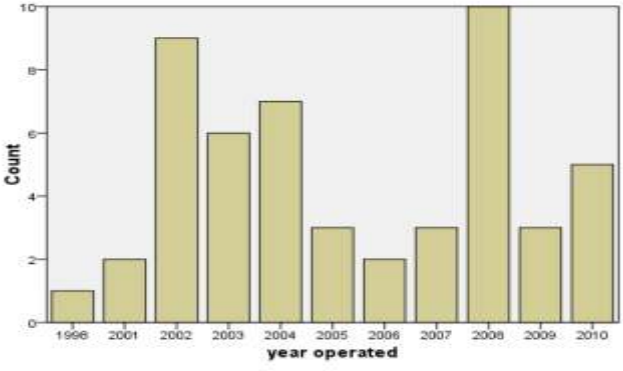
On average patients are kept in the hospital on bed rest for the first week during which time they receive inpatient care which includes IV antibiotics, analgesia, anticoagulant prophylaxis and guarded physiotherapy. At two weeks, they are followed up in clinic as shown in figure 7. Illustrates the findings during the first outpatient review. 2 (3.9%) hips had dislocated and one of these was the one done by the senior registrar and it subsequently got infected (see figure 8). Majority of the patients 45 (88.2%) had the expected post op pain from the surgical site. Only a few 4 (7.8%) had pain and associated stiffness.

Figure 8. Distribution of findings at 6 weeks post-op review. n = 51



The outpatient review at six weeks assessed presence of pain, infection and physical function of the operated joint and the patient. One (2.0%) of the hips were dislocated, two (3.9%) were painful and infected while 48 (94.1%) where healed, functional and mobile with negligible post op pain.

Figure. 9 Trends in Total Hip/Knee replacement Surgery at the ZIOH since 1998



Since 1998, the number of total hip and total knee surgery has been on the rise as exhibited by the table above at the Zambian-Italian Orthopaedic Hospital with a slight drop between 2005 to 2007.

DISCUSSION

The ZIOH Registry was started in 1998 and at the time of this audit, a total of 51 total hip/knee replacement had been done on 46 patients. The variables of the Joint Registry at the Zambian-Italian Orthopaedic Hospital (ZIOH) are similar to those entered into the National Joint Registry pioneered in Malawi. The only variables that were not entered into the ZIOH registry are: use of bone graft, type of cement used, pressuring system and thromboprophylaxis used. Just like those reported from the Malawian registry[1], the early results of total major total joint replacement from the ZIOH are encouraging and comparable with those in other series in terms of complications and improvement in pain and physical function (mobility).

While the Swedish Registry (1992 – 1994) reported a mean age of patients undergoing primary THR as 70 years[11] the ZIOH registry like the Malawian registry reported a relatively younger average age of 58 years and 52 years[1] respectively. For this reason, we would like to echo the need for a longer follow-up period to determine the survival of these hips in these younger patients and the possibility of using cementless arthroplasty in view of the high chance of revision. In the past, long-term follow up was not possible as most patient were lost to follow-up and could not be traced because of the unstructured residential addressing in Zambia. However, the current well established mobile phone technology presents a chance to improve patient follow-ups and has been shown to work well in the adherence to ART programs[12].

As far as the indications for the procedure, our findings were similar to those found in the Swedish study[11] were primary osteoarthritis accounted for 78% and osteoarthritis secondary to trauma 11%. In our patients 36 (70.6%) had primary osteoarthritis as the diagnosis with 3 (5.9%) being due to osteoarthritis secondary to trauma and 7 (13.7%) osteoarthritis secondary to Avascular Necrosis of the head of the femur (AVN). AVN in its early stages is best diagnosed with Magnetic Resonance Imaging (MRI) but in our case this technology is not routinely used because it was not available and was only recently installed at the University Teaching Hospital (UTH) though still remains expensive. This could explain our low AVN prevalence compared to the Malawi study where AVN accounted for 35 (47.9%). Only three of our patients had their HIV status recorded with two of them being HIV positive and the rest had unknown HIV status. Thus, we are not in a position to comment on early infection rates in those that are sero-positive as opposed to the sero-negative. However, we are aware of the high prevalence of HIV in the general population which stands at 16 per cent[8]. It is important, therefore, that patients undergoing major surgery such as total hip/knee replacement are tested for HIV and their status recorded as a variable in the Joint Replacement Register as well as their CD4 cell counts and HAART regimen they are on. This, in future, would help determine the risk of late sepsis around the joint replacements and the role of HAART[4,13]. The rate of dislocation was double that observed in the Malawian study (2.7%) with a total of three hips (5.9%) dislocating within the first six weeks post operation. This reinforces the concern for high probability of dislocations in view of the use of squat toilets, cultural kneeling for women and the subsistence farming which involves manual hoeing[1]. Patients are educated on the need to avoid posture

that could predispose to dislocation before discharge from hospital but are not provided with a toilet "raise" as is said to be routinely done for those with squat toilets in Malawi.

CONCLUSION

This study has helped us recognize the deficiencies in our ZIOH Joint Register in terms of variables entered. It has also helped take note of the short-term outcomes of Joint Replacement at the ZIOH in a systematic way, besides making us realise the need to establish a National Joint Register for Zambia. Pooling of data in a National Joint Register that could be audited at regular intervals will indeed help us make conclusions on outcomes much earlier[1] and such a comparative register will help highlight weaknesses in orthopaedic training and practice which if adequately addresses would contribute to better clinical practice and patient care.

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