PROLAPSED INTERVERTEBRAL DISC IN AN AFRICAN POPULATION: KENYAN EXPERIENCE

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ABSTRACT

***Background*: Characteristics of Prolapsed Intervertebral Disc (PID) in Africa, reports are scanty and often disparate.**

***Objectives*: To evaluate the distribution of PID by location, age, gender and predisposing factors among African patients at our hospital, the largest regional referral and teaching hospital in Kenya.**

***Patients and Methods*: Six hundred and three cases (267 males, 336 females) of prolapsed intervertebral disc over 11 years between January 1997 and December 2007 were analyzed for location, number of prolapsed disks, gender, age and predisposing conditions.**

***Results*: Of the determined locations L4/5 was the commonest (42.3%), followed by L5/S1 (25.5%). Seventy seven (20.9%) of the patients had multiple prolapsed disks. 1.4% were in the cervical region, and only one in the thoracic. PID was commonest in the 31 – 50 year age group females (M: F is 1:1.26, p=0.00), with mean age 40.90±13.80 years, (range between 11- 85 years).**

***Conclusions*: PID in Kenya is commonest in the lower lumbar region of young people more in females and is associated with trauma.**

Key words: PID, Africa

INTRODUCTION

Prolapsed Intervertebral Disc (PID) is a major cause of disability in developing countries(1). The prevalence and characteristics may show ethnic (2,3) and regional (4) variations, with the highest incidence in rural communities where manual work in bending position is the mainstay of livelihood (4). Recent studies indicate that in Africa, it may cause 20 - 35% of low back pain (5,6) creating a public health burden of considerable socioeconomic cost (7). Knowledge of the distribution and risk factors is important in control of the problem, but reports from Africa are scanty and disparate. This study aimed at describing the distribution of PID by site, age, gender and risk factors in an African population seen at a regional referral and teaching hospital in Kenya.

MATERIALS AND METHODS

This was a retrospective cross-sectional study done at Kenyatta National Hospital, the largest regional referral hospital in Eastern and Central African region. It is a 2,000 bed capacity facility in Kenya with 15 consultant orthopaedic surgeons which caters for a wide variety of African patients from the Kenyan capital city, referrals from eight Kenyan level 5 hospitals; and also from the entire Eastern and Central African region. Ethical approval was obtained from the hospital's – Ethics and Research Committee (KNH – ERC). All patients' files with a diagnosis of prolapsed intervertebral disk over 11 years (January 1997 - December 2007), from the hospital's registry were examined. The files were separated into male and female, then each gender into eight age groups each of 10 years, starting from 11 years. The locations of the prolapsed disk, age, gender, and risk/comorbid factors were recorded. The data collected was analyzed using SPSS® version 18.0 for windows. The Students T test was used to determine the significance of the means. A p value of <0.05 was considered significant. Tables and graphs were used to illustrate the findings.

RESULTS

Six hundred and eighteen case files with a diagnosis of PID were reviewed. Of these, six hundred and three cases (267 males and 336 females) were included in this study. Fifteen cases were excluded; one case with an incomplete file, one with assault on the back and 13 cases with clinical diagnosis other than PID such as spinal TB (3 cases), metastatic abdominal carcinomas (2 cases), radiating obstetric pain (3 cases), spondylosis (1 case), pelvic inflammatory disease (2 cases) and other general medical conditions (4 cases). The age range was 11 and 85 years with a mean of 40.90±13.80 years. Three hundred and twenty (53.1%) of the individuals were aged 40 years and less. Only 24 (4%) were below 20 years, and 49(8.1%) were older than 60 years (Table 1). The male: female ratio was 1:1.26; with a female

predominance in all age groups. The overall gender difference was statistically significant (P = 0.000).

To evaluate site distribution, only those cases where the vertebral level was confirmed were included. Two hundred and forty eight cases where the exact site was not recorded were excluded. The remaining 355 were analyzed. One hundred and forty two (49.0%) prolapsed disks were single in the lumbar region, 94 (26.3%) in the lumbosacral junction, followed distantly by the cervical 9(2.5%). One case (0.3%) prolapsed in the thoracic region. In 67 individuals (18.9%), 2 disks prolapsed. The disk levels were (L4/5 and L5/ S1 – 54 cases; L3/4 and L4/5- 6 cases; L2/3 and L3/4 - 1 case; L1/2, L2/L3 – 2 cases; T9/10, T10/T11 – 1 case; cervical - (2 cases); lumbar and cervical 1 case. Ten patients (2.8%) had 3 disks to 5 disks were prolapsed. Most of these disks were contiguous that is L3/4; L4/5; L5/S1. One patient had T11/12; L2/3; L4/5; L5/S1 disks prolapsed (Table 2). One hundred and fifty eight patients (26.2%) [73 females, 85 males]; presented with a history of trauma. The causes of trauma were lifting heavy objects 126 (79.9%), followed by RTA, 24 (15.2%), falling from a height 6 (3.8%), direct stab to the back 2 (1.3%).

Comorbid conditions were recorded in 80 patients. Among these hypertension, diabetes mellitus and obstetric conditions accounted for the majority.

Table 1
Age and gender distribution of PID

		Gender		Total
		Male	Female	
Age	11-20	10	14	24
	21-30	52	61	113
	31-40	77	106	183
	41-50	67	88	155
	51-60	37	42	79
	61-70	19	17	36
	71-80	4	7	11
	81-90	1	1	2
Total		267	336	603

Table 2
Site and age of disk prolapse

					Site				Total
Age	L4,5	L1,2	L3,4	L5,S1	Thoracic disk	Cervical disk	2disks	>2 disks	
11-20	3	0	0	2	0	0	0	0	5
21-30	17	0	2	7	0	2	10	0	38
31-40	43	2	4	40	0	2	22	2	115
41-50	54	2	3	29	1	1	14	4	108
51-60	24	1	2	10	0	31	2	3	55
61-70	14	0	2	2	0	0	8	1	27
71-80	0	0	0	3	0	1	1	0	5
81-90	1	0	0	1	0	0	0	0	2
Total	156	3	13	94	1	9	67	10	355

Table 3
The incidences of level of disc prolapse in various studies

Study	Level of prolapsed %			
	T12-L1, L1-L2, L2-L3	L3-L4	L4-L5	L5-S1
Hsu *et al* [10]				
Bosacco[11]	1.6	4.5	-	-
Deker and Shapiro [12]	<1	-	-	-
Spangfort [13]	0.7	2.9	37	59
Kortelainen *et al* [14]	2.1		49.8	50
Prasad *et al* [15]	5.0	8.3	34.4	26.7
Present study	1.4	3.7	43.9	26.8

Table 4
Male: female ratios from different studies

Author	Population	Sample size	M:F Ratio
Ahmed *et al*[18]	Lahore	160	2.6:1
Munie [20]	Ethiopia	40	5.7.1
Siddiq *et al* [21]	Saudi	64	2.5.1
Arab *et al* [22]	Sudan	112	2:1
Prasad *et al* [15]	India	-	1.1.26
Present study	Kenya	603	1.1.26

DISCUSSION

Observations of the current study are concordant with reports that most of the disk prolapse cases occur in the lumbar region followed by the cervical (8, 9). The commonest lumbar site is L4, 5; followed by L5/S1. The variability in the incidence in level of disk prolapse is, consistent with reports in literature (Table 3).
The high vulnerability of the lumbar spine and especially L4 – 5; L5 – S1 to disc prolapse is related to the increased weight it has to bear due to upright posture, lumbar lordosis and wider range of movement it allows (15,16). These differences may reflect population variations due to genetic and occupational factors (17). Multiple disk prolapses in this study (21.7%) is comparable to the figure described by Prasad *et al*, of 26.7% (15). Multiple prolapsed disks increased with age peaking at 31-40 years as earlier described (1). In almost all the cases multiple prolapsed disks were contiguous and confined to the lumbar region.

The present study reveals, as in previous reports, that PID occurs most frequently in the fourth decade (17,18) and that it is infrequent before 20 and after 65 years. It is thought that after the second decade degenerative changes in discs may result in necrosis, sequestration of the nucleus pulposus, softening and weakening of annulus fibrosus, making it vulnerable to minor strains (16). A likely explanation for the high incidence (87.8%) between 21 – 60 years, is that during this time, individuals are most active and are involved in outdoor activities which expose them to continuous trivial trauma to the spine (15).

PID is infrequent in adolescents, due to the strength of the intervertebral disc (16). Observations of the current study reveal that 1.4% of the victims were below 20 years. Probably this is related to early onset of physical labour in developing countries. Indeed it has been shown that adolescents who engage in intense sports or heavy work related activities are at higher risk of PID (19). Another notable observation is that over 9.6% of the patients were over 60 years old, an age an age group though to be relatively spared (17). This may be related to the profiles of occupational and lifestyle factors some of which continue into old age (7).

The view generally held is that PID is commoner in males than in females (15,19). Observations of the present study, however, reveal that in Kenya, PID is commoner in females than in males. Previous studies have revealed varying male: female ratios (Table 4).

Although there is generally a male predominance, quantitative differences exist in the degree of gender bias, suggesting that variations in genetic or environmental factors influence the gender distribution. The most frequent environmental factors include type of work and position of the body assumed at work (17). The female predominance observed in the present study may be due to the gender differences in the angulation of the lumbar spine (23), it also probably reflects the quality and quantities of work the women folk involve in. Indeed, studies in Africa have demonstrated a correlation between prolapsed disc and intensive farm work, gravidity, weight lifting, strenuous manual labour, cooking methods at home and breast feeding (24).

Gender differences have been demonstrated in preoperative and post-operative responses in PID (9,25). The most common risk factor identified in the present study is trauma, and especially lifting of heavy objects. This supports previous studies which demonstrate that major risks include frequent lifting of objects weighing 25 pounds or more, especially if the objects are lifted with the arms extended and with the knees straight and while the body is twisted (17). In developing countries many people spend their day in unsuitable working positions (4). This implies that potential for reduction of PID include modification of jobs so as to reduce exposure to known occupational risk factors, and careful selection of workers by such means as strength testing for the particular job for which they are to be employed (17). Unfortunately in developing countries majority of the manual workers are unskilled and do not choose jobs. Secondly many skilled workers may be in postures and occupations which predispose them to PID. For this later categories, education on work posture modification and provision of appropriate furniture may be worthwhile. Hypertension and diabetes mellitus are frequently cited as risk factors for PID (4). Observations of the present study reveal that indeed, they are associated, albeit on a small scale, with PID. The mechanism is still unclear but since these are unknown risk factors for atherosclerosis, it is possible that disc degeneration in these conditions

is accelerated by impaired blood supply there to, consequent to occlusive disorders of blood vessels (8).

In conclusion, PID in Kenya is commonest in the lumbar region of persons aged 31 – 50 years, more in females than males and is associated with trauma. Education on working posture and provision of appropriate work infrastructure is recommended.

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