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Hypertension Among Patients With End Stage Renal Disease on Regular Haemodialysis at Gezira Hospital for Renal Diseases and Surgery

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Abstract:

Background: The prevalence of hypertension in patients with chronic kidney disease, from all causes, increases linearly as renal function deteriorates, reaching approximately 95% as patients approach end-stage renal disease.

Objectives: To determine the incidence of hypertension in patients on haemodialysis and to evaluate the control of blood pressure among patients with end stage renal disease.

Patients and methods: This was a prospective cross sectional study, conducted at Gezira Hospital for Renal Diseases and Surgery, Wad Medani, in January 2010. 133 patients with end stage renal disease were enrolled in this study ,blood pressure was measured pre, intra and post dialysis sessions. Drug therapy and the complications of hypertension were recorded.

Results: 89% of all patients were hypertensive, 94.07% out of them were on antihypertensive. Blood pressure was not adequately controlled in 62.16% of the patients. Paradoxical hypertension was found in 12.78%. 14.41% of the hypertensive group admit to have poor compliance for their antihypertensive medications. Calcium channel blockers were used in 42.94%, angiotensin converting enzyme inhibitors 36.72%, beta-blockers 15.26%, angiotensin II receptor in 2.26%, Alpha blocker in 2.26% and diuretics in 0.07% of the cases. 35.58% of the patients were suffering congestive heart failure and 2.26% suffered from cerebrovascular accident.

Conclusions: The prevalence of hypertension in patients on regular haemodialysis mounting to 90%.

ملخص:

خلفية: أن شيوخ فرط ضغط الدم في مرضى الكلي المزمن بكل أسبابه يزداد بالتماشى مع التدهور في وظيفة الكلي ليصل حوالي 95% عند مرضى الكلي في المرحلة النهائية.

الأهداف: تحديد معدل حدوث فرط ضغط الدم في المرضى تحت المعالجة بالغسيل الدموي و تقييم التحكم في فرط ضغط الدم في مرضى الكلي نهائي المرحلة.

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الطرق و المرضى: هذه دراسة توقعية قطاعية اجريت في مستشفى الجزيرة لأمراض و جراحة الكلي – ود مدني، في يناير 2010م. شملت الدراسة 133 مريض كلي بالمرحلة النهائية. تم قياس ضغط الدم قبل و اثناء و بعد جلسة الغسيل الدموي ، كما تم تدوين المعالجات و أي مضاعفات لفرط ضغط الدم

النتائج: 89% من المرضى يعانون فرط ضغط الدم و 94.57% منهم يتناولون العلاج. ضغط الدم لم يكن متحكماً به على نحو كاف في 62.16% من المرضى ، فرط ضغط الدم المتناقض ظاهرياً وجد في 12.78% من الحالات ، 14.41% من المرضى أقرروا باستجابتهم الضعيفة في المواظبة بتناول الدواء . الأدوية المستعملة كانت محصرات قنوات الكالسيوم في 42.94%، مثبطات الإنزيم المحول للأنجيوتنسين في 36.72%، محصرات بيتا في 15.26% مستقبلات أنجيوتنسين II في 2.26%، محصرات ألفا في 2.26% و مدررات البول في 5.57% . 35.58% من الحالات تعاني هبوط القلب الاحتقاني و 2.26% تعاني من اصابة مخيبة و عائية.

الخلاصة: شيوع فرط ضغط الدم في المرضى تحت المعالجة بالغسيل الدموي تصل الى 90%.

keywords: End stage renal disease, Hypertension, Haemodialysis, Gezira, Sudan.

Introduction:

A high level of arterial blood pressure (BP), or hypertension, is a mortality and morbidity risk factor for cardiovascular and kidney disease and is responsible for 7.1 million deaths and 64 million disease adjusted life-years lost worldwide ⁽¹⁾ It is estimated that 25–35% of the world's population older than 18 years and more than 60% of individuals older than 70 years have blood pressure levels of $\geq 140/90$ mmHg ⁽²⁾. Prevalence of hypertension in Sudan was estimated to be 7.5% ⁽³⁾. The prevalence of hypertension in patients with chronic kidney disease (CKD) from all causes increases linearly as renal function deteriorates, reaching approx 95% as patients approach end-stage renal disease (ESRD) ⁽⁴⁻⁶⁾.

The aetiology of hypertension in end-stage renal disease is multifactorial ^(7,8,9), which includes sodium and volume excess due to diminished sodium excretory capacity, activation of the renin-angiotensin-aldosterone system increased activity of the sympathetic nervous system, an increase in endothelium-derived vasoconstrictors or a reduction in endothelium-derived vasodilators, administration of erythropoietin, an increase in intracellular calcium induced by parathyroid hormone excess, calcification of the arterial tree and pre-existent essential hypertension. ^(10,11)

The goal of antihypertensive therapy in ESRD is to adequately control BP levels, in order to prevent or improve end-organ damage such as atherosclerosis or left ventricular hypertrophy (LVH).

Most of the guidelines suggest a goal of $<140/90$ mmHg for both hemodialysis (HD) and peritoneal dialysis (PD) patients ^(12,13,14). Control of volume status can either normalize the BP or make the hypertension easier to control in the great majority of dialysis patients ^(15,16).

Patients and methodology:

Prospective cross sectional study, conducted at Gezira hospital for renal diseases and surgery, Wad Medani, in January 2010. Objective of this study is to assess the prevalence and status of blood pressure

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control among HD. 133 patients with ESRD on regular HD two session per week, each was four hours, at Gezira hospital for renal diseases and surgery (Sudan), were enrolled in the study.

Hypertension was defined as BP \geq 140/90. Data were collected using a structured questionnaire and from medical records. Data collected included age, sex, duration of hypertension, hypertension treatment and the presence or absence of complications of hypertension. Blood pressure was measured pre-dialysis, interdialysis and post-dialysis. Data was analyzed using SPSS software .

Results:

Total number of patients included in this study was 133; 66% (88) were males and 34% (45) were female. The mean duration of hypertension was 3.55 (SD 2.67) year; mean age of the study group was 45.78 (SD 23.74) years; mean duration of HD 4.17 (SD 6.49) years; 89% (118) of the study group were hypertensive and 11% (15) were normotensive. 94.07% (111) were taking antihypertensive; 49.55% (55) were taking single drug, 39.64% (44) were taking two drugs, 10.81% (12) were taking three drugs; the duration of hypertension was 4.21 (4.61) years. Blood pressure was not adequately controlled in 62.16% (69) of the patients, blood pressure were controlled in 37.84% (42). Paradoxical hypertension was found in 12.78% (17); 12.78% (17) of the study group were diabetic; 35.58% (46) were suffering from congestive heart failure and 2.26% (3) suffered from cerebrovascular accident. 14.41% (17) of the hypertensive group admitted to have poor compliance for their antihypertensive medications. Prescribed antihypertensive drugs are shown in figure (1).

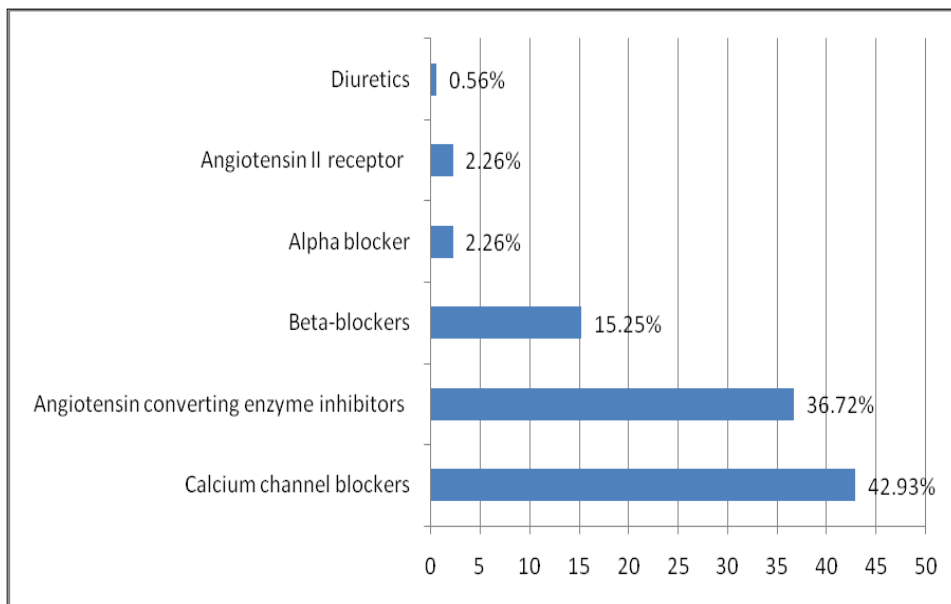


Figure 1: Prescribed Antihypertensive Medications

Discussion:

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Hypertension, either as a primary cause, or consequence of renal failure, is a major risk factor contributing to the high cardiovascular morbidity and mortality in uraemic patients, frequency of hypertension range from 60% to 95% among patients ESRD on HD^(9,10,11,17,18,19,20). In our study we found 89% of HD patients were having hypertension. Only thirty percent (30%) of all hypertensive patients in the States have their BP adequately controlled^(21,22). Patients in a large dialysis centre in Tassin, France and some home haemodialysis patients undergo long, slow HD in which the standard regimen is eight hours, three times per week. This regimen is associated with the maintenance of normotension without medications in almost all patients^(23,24,25,26).

The National Kidney Foundation Dialysis Outcomes Quality Initiative (K/DOQI), European Best Practice Guidelines, Canadian Clinical Practice Guidelines for the Haemodialysis and UK Renal Association recommend that the minimal adequate number of sessions of HD is three sessions per week for at least four hours for each sessions.^(13,27,28) In Sudan for financial reasons we provide our patients with two sessions of HD per week four hours each. The BP in 62.16% of our patients was not controlled. The European Best Practice Guidelines recommend that the treatment time and/or frequency of dialysis should be increased in patients with hypertension despite optimal volume removal.

Cheigh reported that In 14% of patients there is a paradoxical postdialysis rise in arterial pressure⁽²⁹⁾. We found that 12.78% of our patients developed paradoxical hypertension. The pathogenesis of paradoxical hypertension is unclear, although some evidence suggests that altered nitric oxide/endothelin-1 balance may contribute.⁽³⁰⁾

Mahboob reported that antihypertensive drugs were prescribed for 76% of the patients; 25% required three or more drugs¹⁷; in our study 94.07% were taking antihypertensive; 49.55% were taking single drug, 39.64% were taking two drugs, 10.81% were taking three drugs. We found that the most common prescribed antihypertensive for our patients was calcium channel blockers followed by angiotensin converting enzyme inhibitors, beta-blockers, angiotensin II receptor, Alpha blocker and diuretics respectively. Similar finding we reported by Pavlović⁽³¹⁾. Calcium channel blockers are both effective and well tolerated in dialysis patients, even in those who are volume expanded⁽³²⁾. They are particularly useful in patients with left ventricular hypertrophy and diastolic dysfunction.

Elzubier studied the compliance of antihypertensive drugs in Kassala; he reported that 59.6% patients were compliant with treatment; 14.41% of our patients were having poor compliance. Cardiovascular disease is an important cause of mortality in patients undergoing maintenance dialysis, accounting for almost 50% of deaths^(33,34). Harnett conduct a prospective study of 432 patients found that 31% had evidence of congestive heart failure at onset of dialysis and 25% of those without initial heart failure subsequently developed congestive heart failure at a rate of approximately 7% per year⁽³⁵⁾. In this study we found congestive heart failure in 36.72% of the study group.

Patients on dialysis are at an increased risk of cerebrovascular disease because of accelerated atherosclerosis, a high incidence of hypertension, diabetes, malnutrition, and hyperlipidemia^(36,38). In a survey from Japan included 1,609 patients, patients on maintenance dialysis had a relative risk of 5.2% for stroke, 10.7% for cerebral haemorrhage, and 4.0% for subarachnoid haemorrhage compared to normal subjects⁽³⁷⁾. While in the States a relative risk of ischaemic and haemorrhagic stroke of 4.3% to 10.1%

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and 4.1% to 6.7%, respectively, compared with the normal population⁽³⁹⁾. In this study we found that 26% of the cases suffered from cerebrovascular accident.

Conclusions and recommendations:

The prevalence of hypertension in patients on regular haemodialysis mounting to 90%. Blood pressure is not adequately controlled in 62.16% of the patients.

We recommend increasing the numbers of haemodialysis sessions to three sessions per week.

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