Incidence of Intradialytic Hypotension in Patients on Hemodialysis in Al Kindy Teaching Hospital

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Abstract

Im Of The Study: To Find Out The Incidence Of Intradialytic Hypotension In Esrd. Patients And Methods: From March To August 2010, (50) Patients With Esrd On Chronic Hemodialysis Program In Al Kindy Teaching Hospital Dialysis Unit Were Studied Cross Sectionally For Evidence Of Idh. The Patients Were On Hemodialysis Program For A Period That Ranged Between 1/4/2004 And 12/4/2010. The Study Sample Consists Of 25 Men And 25 Women With An Age From 18 To 80 Years And Their Body Weight Varied From 40 To 94 Kg And Height Varied From 140 To 186 Cm. Heparin Is Used As An Anticoagulant. Frequency Of Dialysis Differed From One Patient To Another Depending On Patient Condition, Availability Of Machine, It Ranged From Once Weekly To Thrice Weekly Lasting 3-4 Hours Per Session. The Blood Pressure Of All (50) Patients Were Measured Using Mercury Type Sphygmomanometer. The Blood Pressure Were Measured Pre Dialysis During And Post Dialysis. Ultrasound Of Abdomen Done For All (50) Patients. Idh Is Defined As A Decrease In Systolic Blood Pressure By ≥20 Mm Hg Or A Decrease In Map By 10 Associated With Symptoms That Include; Abdominal Discomfort, Yawning, Sighing, Nausea, Vomiting, Muscle Cramps, Restlessness, Dizziness Or Fainting And Anxiety. Results: For 50 Patients The Following Results Obtained: The Total Number Is 20 Patients Developed Idh(40%). 25 Females, Of Them 12 Patients Developed Idh(48%). 25 Males, Of Them 8 Patients Developed Idh(32%). 6 Patient Of Age ≥_65 Years, Of Them 3 Patients Developed Idh(50%). 19 Patients Are Overweight (Bmi>25), Of Them 9 Patients Developed Idh(47.4%). 28 Patients With Normal Weight (Bmi=18.5-25), Of Them 10 Patients Developed Idh(35.7%), 3 Patients Are Under Weight (Bmi<18.5), Of Them One Patient Developed Idh(33.3%). 41 Patients Take Antihypertensive Treatment, Of Them 16 Patients Developed Idh(39%), 5 Patients Have Diabetes, Of Them 2 Patients Developed Idh(40%). Discussion: Intradialytic Hypotension Is The Most Common Complication Associated With Hd, And Its Cause Is Multifactorial. Patients Subgroups Most Likely to Have Idh Include Those with Diabetic Ckd and Age ≥_65 Years. Both Normotensive And Hypertensive Dialysis Patients Can Develop Idh. The Degree Of Idh In The Same Patient May Vary From Tim To Time, Other Risk Factors For The Development Of Idh Include Female Sex, And The Use Of Nitrates Before A Dialysis Session & Overzealous Use Of Antihypertensive Agents. Conclusion: Idh Is an Important Complication of Hemodialysis. thereis asignificant Number of Patients with Esrd Who Developed Idh. Keywords: Intradialytic Hypotension, Hemodialysis, Al:Kindy Teaching Hospital

Introduction

Hemodialysis Is Now Considered A Routine Treatment, And Many Patients Now Are Dialyzed In An Outpatient Setting Without Direct Medical Supervision, Or At Home Without Any Support. This Change In Practice Has Been Because Of The Technological Advances And Reliability Of Dialysis Machine Equipment, Vascular Access, Dialyzer Membranes, And Water Supply.

- A Rapid Reduction In Plasma Osmolality, Which Causes Extracellular Water To Move Into The Cells [2].
- Rapid Fluid Removal In An Attempt To Attain "Dry Weight" Particularly Among Those With Large Interdialytic Weight Gains [9,10].
- Autonomic Neuropathy [2].
- Diminished Cardiac Reserve [12].
- Use Of Acetate Rather Than Bicarbonate As A Dialysate Buffer [2].
- Intake Of Antihypertensive Medication That Can Impair Cardiovascular Stability [2].
- Sudden Release Of Adenosine During Organ Ischemia [13].
- Ingestion Of A Meal Immediately Before Or During Dialysis [2].

Clinical Training Sessions On Idh Risk Recognition And Appropriate Treatment Should Be Implemented Within The Dialysis Unit. Because Repeated Bouts Of Idh Can Be Disruptive To The Smooth Efficiency Of Unit Operations, Attention To Prevention As Well As Acute Intervention Of Idh Is Important. Preventive Strategies Can Be Developed In Each Unit To Decrease The Number Of Future Idh Events. Considering The Importance Of Hypotension In Overall Patient Survival, Attention To Identifying The Percentage Of Patients In Each Unit Who Experience Idh And/Or Who Present With Low Blood Pressure (Systolic <110 Mm Hg) Should Be Tracked As A Quality Assurance Initiative.[8]The Higher The Dialysate Sodium, The Smaller The Decline In Plasma Volume For Any Given Amount Of Uf. Use Of A Dialysate Temperature That Prevents A Positive Thermal Balance During Dialysis Will Allow Peripheral Vascular Resistance To Be Maintained And Minimize Idh. A Higher Ionized Calcium During Treatment Facilitates An Increase In Cardiac Output, A Benefit That May Be Particularly Notable In Patients With Depressed Cardiac Ejection Fraction. Low Dialysate Magnesium, Potassium, And Bicarbonate May All Favor Idh, Although Insufficient Data Are Available For Definitive Conclusions. The Choice Of Antihypertensive Medication And The Treatment Schedule Must Be Carefully Considered In Patients With Idh. The Future Integration Of Technology To Monitor Blood Pressure, Plasma Volume, And Thermal And Sodium Balance Into A Computer-Based Biofeedback System Will Very Likely Go A Long Way Toward Reducing The Frequency Of Idh [14].Cool Dialysate And Midodrine Appear To Improve Intradialytic Hemodynamic In Patients With Dialysis-Associated Hypotension, Mainly Through The Preservation Of Circulating Blood Volume And Cardiac Output, Rather Than Significantly Elevating Peripheral Vascular Resistance [15].It Is Becoming Increasingly Important To Identify Patients At “High Risk” For Idh, To Customize The Hd Prescription To The Individual Patient, To Use Drug Therapy To Prevent Idh Events, And To Track The Prevalence Of Chronic Hypotension And The Incidence Of Idh Complications In The Dialysis Unit[16].

**Aim Of The Study:** To Find Out The Incidence Of Intradialytic Hypotension In ESRD.

**Patients and Methods**

From March To August 2010, (50) Patients With ESRD On Chronic Hemodialysis Program In Al Kindi Teaching Hospital Dialysis Unit Were Studied Cross Sectionally For Evidence Of Idh. The Patients Were On Hemodialysis Program For A Period That Ranged Between 1/4/2004 And 12/4/2010. The Study Sample Consists Of 25 Men And 25 Women With An Age From 18 To 80 Years And Their Body Weight Varied From 40 To 94 Kg And Height Varied From 140 To 186 Cm. Heparin Is Used As An Anticoagulant. Frequency Of Dialysis Differed From One Patient To Another Depending On Patient Condition, Availability Of Machine, It Ranged From Once Weekly To Thrice Weekly Lasting 3-4 Hours Per Session. The Blood Pressure Of All (50) Patients Were Measured Using Mercury Type Sphygmomanometer. The Blood Pressure Were Measured Pre Dialysis During And Post Dialysis. Ultrasound Of Abdomen Done For All (50) Patients. Idh Is Defined As A Decrease In Systolic Blood Pressure By $\geq$20 Mm Hg Or A Decrease In MAP By 10 Associated With Symptoms That Include ; Abdominal Discomfort, Yawning, Sighing, Nausea, Vomiting, Muscle Cramps, Restlessness, Dizziness Or Fainting And Anxiety[2]. The **Mean Arterial Pressure (MAP)** Is A Term Used In Medicine To Describe An Average Blood Pressure In An Individual[17]. It Is
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Defined As The Average Arterial Pressure During A Single Cardiac Cycle. Mean Arterial Pressure Can Be Determined From:[18] [19][20][21]

\[
MAP \approx DP + \frac{1}{3}(SP - DP) \quad \text{Or Equivalently}
\]

\[
MAP \approx \frac{2}{3}(DP) + \frac{1}{3}(SP) \quad \text{Or Equivalently}
\]

\[
MAP \approx \frac{(2 \times DP) + SP}{3} \quad \text{Or Equivalently}
\]

\[
MAP \approx DP + \frac{1}{3}PP \quad \text{Where } PP \text{ Is The Pulse Pressure, } SP - Dp
\]

Results

The Changes In Blood Pressure Showed Considerable Inter-Individual Variability. Table No.1 Shows The Predialytic (Systolic And Diastolic) Blood Pressure And The Changes In Blood Pressure That Occurred During Hemodialysis For The Total 50 Patients. For 50 Patients The Following Results Obtained:

- **14**Patients Have Decrease In Systolic Blood Pressure ≥20 Mm Hg, **16** Patients Have Decrease In Map ≥10, The Total Number Is 20 Patients Developed Idh, And The Percentage Is 40 (Table No. 2 ).

- **25**Females, **8** Of Them Have Decrease In Systolic Blood Pressure ≥20 Mm Hg, **9** Of Those 25 Have Decrease In Map ≥10, The Total Number Is 12 Patients Develop Idh, And The Percentage Is **48** (Table No. 3).

- **25**Males, **6** Of Them Have Decrease In Systolic Blood Pressure ≥20, **7** Of Those 25 Have Decrease In Map ≥10, The Total Number Is 8 Patients Develop Idh, And The Percentage Is **32** (Table No. 4).

- **6** Patients Of Age ≥65 Years, **3** Of Them Have Decrease In Systolic Blood Pressure ≥20, And The Same **3** Patients Have Decrease In Map ≥10, So The Total Number Is 3 Patients Develop Idh, And The Percentage Is **50** (Table No. 5).

- **19 Patients Are Overweight** (>25)[22][23], **7 Of Them Have Decrease In Systolic Blood Pressure ≥20 Mm Hg, 8 Of Those 19 Have Decrease In Map ≥10, The Total Number Is 9 Patients Develop Idh, And The Percentage Is 47.4 (Table No. 6).

- **28 Patients With Normal Weight (18.5-25)[22][23], 6 Of Them Have Decrease In Systolic Blood Pressure ≥20 Mm Hg, 7 Of Those 28 Have Decrease In Map ≥10, The Total Number Is 10 Patients Develop Idh, And The Percentage Is 35.7 (Table No. 7).

- **3** Patients Are Underweight (<18.5)[22][23], **1 Of Them Has Decrease In Systolic Blood Pressure ≥20 Mm Hg And The Same Patient Has Decrease In Map ≥10, So The Total Number Is One Patient Develop Idh, And The Percentage Is **33** (Table No. 8).

- **41patients take antihypertensive Treatment, 11 Of Them Have Decrease In Systolic Blood Pressure ≥20 Mm Hg, 13 Of Those 41 Have Decrease In Map ≥10, The Total Number Is 16 Patients Develop Idh, And The Percentage Is 39 (Table No. 9).

- **5** Patients Have Diabetes, **2 Of Them Have Decrease In Systolic Blood Pressure ≥20, And The Same 2 Patients Have Decrease In Map ≥10, So The Total Number Is 2 Patients develop idh, and the percentage is 40 (Table No. 10).
Table 1. The Bp For The Total 50 Patients Pre And During Hemodialysis

Table 2. Patients Develop Idh

Table 3. Female Patients That Develop Idh

Table 4. Male Patients That Develop Idh
Table 5. Patients With Age ≥ 65 That Develop Idh

Table 6. Overweight Patients That Develop Idh

Table 7. Normal Weight Patients That Develop Idh
Discussion

Intradialytic Hypotension Continues To Play A Significant Role In The Morbidity And In Some Cases The Mortality Associated With Maintenance HD [24]. Intradialytic Hypotension Is The Most Common Complication Associated With HD, And Its Cause Is Multifactorial [25]. During The Past 10 Years, Despite Improvement In Dialysis Technology, The Frequency Of Idh Has Remained
Unchanged At About 25% Of All Hd Sessions[26]. In This Study Idh Is Found In 28% On Patients On Chronic Hemodialysis From March To August 2010. The Incidence Of Idh Will Continue To Increase As An Increasing Number Of Elderly Patients Will Develop Ckd, And Also Due To The Progressive Increase In The Number Of Diabetic Patients With Ckd. Patient Subgroups Most Likely To Have Idh Include Those With Diabetic Ckd And Age ≥65 Years[26]. In This Study We Found A Similar Relation Between Patients Of Age≥65years and idh[26]. Hypotension Is The Most Common Acute complication of hd, particularly among Diabetics[2][26]. In This Study Idh Was More Common In Diabetic Patients With Ckd. A Small Group Of Patients (5%-10%) May Have Low Systolic Blood Pressure (<100 Mm Hg) At The Initiation Of Dialysis[27]. This Group Includes Anephric Patients, Those Who Are On Dialysis For A Longer Period, And Diabetic Patients With Persistent Orthostatic Hypotension Due To Autonomic Dysfunction. Patients On Dialysis With Autonomic Dysfunction Show An Exaggerated Drop In Systolic And Diastolic Blood Pressures, Compared To Those Without Underlying Autonomic Dysfunction[28]. In Our Study Only One Patient HadPredialysis Systolic Blood Pressure 100 Mm Hg Which Remained Stable All Through The Sessions. Both Normotensive Or Hypertensive Dialysis Patients Can Develop Idh. The Degree Of Idh In The Same Patient May Vary From Time To Time[6]. In This Study We Found A Similar Relation With Decrease In Blood Pressure During Hemodialysis In Both Normotensive And Hypertensive Patients, With Variation In The Degree Of Idh In The Same Patient From Time To Time. Other Risk Factors For The Development Of Idh Include Female Sex, And The Use Of Nitrates Before A Dialysis Session[6]. In This Study We Found A Similar Relation Between Female Sex And Idh. One Of The Causes Of Idh Is Overzealous Use Of Antihypertensive Agents[2]. In Our Study We Found A Significant Relation Between The Use Of Antihypertensive Drugs And Idh.

Conclusion


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