Health Issues in Young Women with ESRD

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Disclosures

- No financial disclosures
- No conflict of interest disclosures
- This talk encompasses the age group of young women, in some instances, younger than 18. Some medications discussed may fall outside the scope of FDA labeling. Specific instances will be highlighted (**) and your attention directed to this during the presentation. These are included as a case study, not recommendations for specific therapeutic applications.

Objectives

- Identify issues related to young women who have end-stage renal disease (ESRD)
- Review approaches to help young women transition from adolescence to successful young adulthood
Defining Young Women

- Cultural definitions
  - Age-based formal rites of passage are often male-predominant
- Traditional definitions
  - Onset of menses
  - Marriage
  - First child birth

Defining Young Women

- Modern societal definitions
  - Driving
  - Voting
  - Independent living
- Developmental approach
  - Post-pubertal transition to adulthood

Case - Patient A

- 10 year old female presents with nephrotic syndrome, 5 grams proteinuria, albumin <0.6, anasarca, and stage II hypertension.
- Past medical history - previously well
- Product of a twin term gestation
- She now presents with normal growth parameters, no allergies, and no other positive findings on history.
Patient A

- Steroid resistant (No remission with 12 weeks of prednisone)
- Biopsy shows minimal change disease
- Methylprednisolone, dosing per Tune-Mendoza protocol achieved some remission, but limited to 4 or fewer months in duration
- Resistant to cyclophosphamide
- Cyclosporine (CSA) dependent**
- Repeat biopsy 18 months into therapy showed small sample size, but glomeruli consistent with FSGS.

Patient A

- Tacrolimus** and mycophenolate mofetil** were added, patient had ongoing frequently relapsing pattern
- Many relapses with acute kidney injury (AKI)
- Malignant hypertension, left ventricular hypertrophy
- Age 14 - relapse, AKI, absent renal recovery prompted biopsy, with 90% glomerular sclerosis and 80% interstitial fibrosis
- Hemodialysis started.

Systems Approach

- Anemia
- Access
- Bone metabolism
- Nutrition and growth
- Cardiovascular disease
- Transplant
- Development
Anemia – Iron Intake (Without CKD/ESRD)

<table>
<thead>
<tr>
<th>Group</th>
<th>Age 12-19</th>
<th>Age &gt;20</th>
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<tbody>
<tr>
<td>West</td>
<td>72</td>
<td>73</td>
</tr>
<tr>
<td>White</td>
<td>72.8</td>
<td>73.1</td>
</tr>
<tr>
<td>Black</td>
<td>74.9</td>
<td>78.2</td>
</tr>
<tr>
<td>Mexican-American</td>
<td>71</td>
<td>78</td>
</tr>
<tr>
<td>Other Hispanic</td>
<td>70</td>
<td>73</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>72.8</td>
<td>59.6</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>75.5</td>
<td>71</td>
</tr>
</tbody>
</table>

Anemia – Iron Deficiency

- Without CKD or ESRD
- Menses
  - Iron loss - average 0.3 - 0.8 mg per day during childbearing years
- Iron deficiency is found in 12% of young women (NHANES III)
- Women ages 16-49 have the highest incidence of iron deficiency
  - Range 11-22%
  - Mexican-American women ages 20-49 – 22%

Anemia – Without CKD/ESRD ((MMWR))

- Iron-deficiency anemia incidence 2-5%, consistent with the remainder of the population.
Access

- Fistula first
- Central venous catheter at start of hemodialysis – female 22.9% vs male 13.3% (USRDS 2010)
- Possible reasons for fewer fistulas
  - Smaller venous diameter
  - Reports of higher inadequacy in AVF formed in women
  - Cosmetic concerns

Bone Metabolism

- Calcium intake – 13-24% of females 12-49 take take 100% of RDA
- Vitamin D deficiency - Increased incidence in children is reported at 20-65% from various sources
  - AAP recommended minimum intake was doubled in 2008 to 400 IU per day
- Prevalence of vitamin D deficiency was identified in children with CKD – overall 38% in one study
- Osteopenia in adolescents poorly defined - anorexia, chronic intestinal inflammation or developmental delay
- Exercise - strengthens bone but fatigue, acidosis, fluid imbalance may diminish exercise avidity and frequency

Bone Metabolism

- KDOQI/kidney.org
**Nutrition/Growth**

- Adult height prediction
  - Growth trajectory prior to onset of CKD
  - Peak height velocity in the 1-2 years prior to menarche, with 10.8 - 22.3 cm after menarche
  - Mid-parental height
    - Adjust paternal height down by 5 inches, then average with mother's height for a female mid-parental height.
  - Post-menarchal height – prediction of 7.4 - 10.6 cm
  - Bone age – essential in growth hormone evaluation
- Protein requirements
- Body image – Height interaction versus pain of injections for GH

**Cardiovascular Disease**

- Risk factors
  - HTN
  - LVH
  - Obesity
  - Diabetes
  - Hyperlipidemia

**Cardiovascular disease**

- Burden of cardiovascular disease is becoming more apparent in pediatrics and young adulthood.
- Myocardial stunning with hemodialysis
  - 11 of 12 patients had significant regional wall abnormalities, defined as 20% reduction in ventricular wall shortening.
  - (Hothi et al 2009)
Transplant

- Age may increase the numbers of eligible donors
  - Young adult peers...siblings, friends
  - Older groups...parents under age limits for donation
- Age group 18-34 years have lower than average time to transplant after listing (approx 930 days versus approx 1300 days) (SRTR)

Transplant Outcomes (SRTR)

Transplant

- Arizona - concerns regarding those ineligible for transplant
- Social networking - is there a role in organ donation?
Patient A

- 16 years of age
- Refused fistula twice
- Referred for transplant twice
- Each time hyperphosphatemia or lack of fluid control suspended the transplant process
- She admitted to eating high phosphorus foods to protect any family members from the potential risk of donation.
- Develops a brown tumor requiring removal.

Development

- Physical maturation / secondary sexual development
  - Sexual maturation, pregnancy
- Cognitive / social development

Developmental Tasks

- Abstract thinking
- Development of perspective (absorbing the viewpoints of others)
- Ability for introspection
- Peer relationships
- Personal and sexual identity
- Establish a system of values
- Autonomy from family and personal independence
- Development of coping strategies
Approaches to Aid Psychosocial Development

- Pediatric hemodialysis unit becomes a peer group, with inherent positive and negative role modeling.
  - Fostering this in a structured manner can offer peer group growth.

Approaches to Aid Psychosocial Development

- School re-entry services
  - Teacher in the dialysis unit facilitates school re-entry and transitions
  - Independent school work while on dialysis
  - Peer-group appropriate interactions
  - Personal accountability
  - Opportunity for positive reinforcement of behaviors
  - Natural segue into advisement for advanced education or vocational rehab

Approaches to Aid Psychosocial Development

- Structured social activities
  - Medically-supported camping experience for 8 and older
  - Monthly activities
    - Board game night
    - Arcade game night
    - Bowling
  - Social interaction in standard social situations
  - Social interaction for families
Approaches to Aid Psychosocial Development

- Intentional progression of responsibilities, with "homework"
  - "I can't endorse a driver's license until you can tell me (and hence the ER) your medications."
  - Type medications into your iPod for next visit
  - College dorm...remember to take your medications
  - Independent apartment...arrange transportation to clinic
  - Transplant...demonstrate successful adherence

Approaches to Aid Psychosocial Development

- Role modeling
- Dialysis unit as a community
- All team members, dieticians, social workers, nurses, child-life specialists, teachers, transplant coordinators, and physicians participate in community activities
  - Camp
  - Monthly outside activities
  - In-unit billboards, i.e. "What are your goals for the new year?"

Approaches to Aid Psychosocial Development

- Recognize a prolonged adolescence - variable with respect to chronologic age
- Encourage familial education and assistance
- When adolescents "graduate" to an adult dialysis unit, they are likely not finished with development, particularly psychosocially.
- Transition team can augment these steps.
Patient A

- 17+ years old
- Excellent phosphorus control
- Finalizing transplant workup

Summary

- Many features of routine adolescent health place increased risk on ESRD care.
- Nutrition and growth are a major component of adolescence, requiring particular attention.
- Adolescence is not complete at age 18. Young adults require support to successfully complete this normal developmental process.

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