Management of Patients Undergoing Dysvascular Limb Amputation

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Disclosure

- No commercial or funding conflicts of interest
Objectives

• *Estimate perioperative risk* in patients undergoing dysvascular limb amputation

• *Identify issues surrounding post-operative course* of patients undergoing dysvascular limb amputation

• *Manage secondary prevention* in patients with peripheral vascular disease
Amputee Population

- Dysvascular: 80%
- Cancer: 15%
- Trauma: 3%
- Other: 2%
Dysvascular amputation

- Due to Diabetes/PVD
- 2/3 are male, typically over 60 years old
- Highest risk: diabetics with > 3 co-morbidities
- > 4000 per year in Canada and rising
Mr. Dysvascular
Red Flags?

• DM 2 > 10 years
• Neuropathy
• Retinopathy
• PVD, CAD
• ESRD on dialysis
Life or death?
Life Expectancy

- 1 year
- 3 year
- 5 year
- Better or worse than metastatic stage 3 colon cancer?
the 3 year mortality rate for dysvascular am

Start the presentation to activate live content

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Mr. Dysvascular

• Left BKA: age 49
• Right BKA: age 52
• Died 3 months post op
the 3 year mortality rate for dysvascular am
Perioperative Mortality

- 30 day mortality 10%
- Preop septic shock and thrombocytopenia risk factors
- Increases with degree of renal dysfunction
- Dialysis patients > 15%
High mortality rates

- 1 year: > 30%
- 3 year: > 50%
- 5 year > 70%
- No improvement in last 40 years
Higher Risk of Mortality

- End Stage Renal Disease, Dialysis
- Cardiovascular Disease *, MI
- Advanced age
- Chronic Obstructive Sleep Apnea *
- Smoking/COPD *
- Sedentary lifestyle *
Causes of Death

• #1 - Cardiovascular (MI, Stroke, CHF)
• Infection/Sepsis
• Respiratory failure
Post-operative Complications
Multiple amputations

- 10% have further amputations in same admission
  - Ischemia, infection
  - Falls
- > 50% of patients that survive have a contralateral amputation within 3 years
Pressure sores

- Immobile patients!
- Cannot feel pressure!
  - Offload foot
  - Consider mattress and wheelchair cushion
Mood

• High rates of adjustment disorder, depression/anxiety, suicidal ideation
  – Early Psychiatry interventions

• Consider pre-amputation and/or post-amputation rehab consult

• Peer support helpful

• Amputee Coalition of Canada – visitor programs
  – http://amputeecoalitioncanada.org
Other complications

- Residual limb pain
- Phantom pain
  - Neuropathic pain medications
  - Mirror therapy, apps, TENS
- Contractures
  - Early mobilization important
  - Amputee boards on wheelchair
Risk Factor Modification

• Optimal diabetes management
  • Lower re-admission rates post-amputation
• Associated with lower risk of major cardiac events
• Shalaeva 2017: 28/179 patients died one year post
  – 93% were in non-compliant patients
Non-compliance factors

- Inability to pay for prescriptions, exercise, food
- Reluctance to be on long-term medications
- Multiple medications
- Poor patient-provider relationship
- Low level of knowledge of their chronic disease(s)
- Younger patients < 45 years old
Cardiovascular ABCDES

- **A**: A1c <= 7% *
- **B**: Blood Pressure < 130/80
- **C**: Cholesterol LDL <=2.0
- **D**: Drugs to protect the heart
- **E**: Exercise and Eating healthy
- **S**: Smoking cessation
Nutrition

- Ideally nutrition counselling from a dietician
- 5-10% weight loss
  - Improved insulin sensitivity, BS, BP and Lipids
- Mediterranean, Vegan/Vegetarian, Dietary Pulses
- Low glycemic index carbohydrates
<table>
<thead>
<tr>
<th>LOW GI (55 OR LESS) **†</th>
<th>MEDIUM GI (56-69) **†</th>
<th>HIGH GI (70 OR MORE) **†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Choose most often ✓✓✓</strong></td>
<td><strong>Choose more often ✓✓</strong></td>
<td><strong>Choose less often ✓</strong></td>
</tr>
<tr>
<td><strong>BREADS:</strong></td>
<td><strong>BREADS:</strong></td>
<td><strong>BREADS:</strong></td>
</tr>
<tr>
<td>100% stone ground whole wheat</td>
<td>Whole wheat</td>
<td>White bread</td>
</tr>
<tr>
<td>Heavy mixed grain</td>
<td>Rye</td>
<td>Kaiser roll</td>
</tr>
<tr>
<td>Pumpernickel</td>
<td>Pita</td>
<td>Bagel, white</td>
</tr>
<tr>
<td><strong>CEREAL:</strong></td>
<td><strong>CEREAL:</strong></td>
<td><strong>CEREAL:</strong></td>
</tr>
<tr>
<td>All Bran™</td>
<td>Grapenuts™</td>
<td>Bran flakes</td>
</tr>
<tr>
<td>Bran Buds with Psyllium™</td>
<td>Puffed wheat</td>
<td>Corn flakes</td>
</tr>
<tr>
<td>Oat Bran™</td>
<td>Oatmeal</td>
<td>Rice Krispies™</td>
</tr>
<tr>
<td></td>
<td>Quick oats</td>
<td></td>
</tr>
<tr>
<td><strong>GRAINS:</strong></td>
<td><strong>GRAINS:</strong></td>
<td><strong>GRAINS:</strong></td>
</tr>
<tr>
<td>Barley</td>
<td>Basmati rice</td>
<td>Short-grain rice</td>
</tr>
<tr>
<td>Bulgar</td>
<td>Brown rice</td>
<td></td>
</tr>
<tr>
<td>Pasta/noodles</td>
<td>Couscous</td>
<td></td>
</tr>
<tr>
<td>Parboiled or converted rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OTHER:</strong></td>
<td><strong>OTHER:</strong></td>
<td><strong>OTHER:</strong></td>
</tr>
<tr>
<td>Sweet potato</td>
<td>Potato, new/white</td>
<td>Potato, baking (Russet)</td>
</tr>
<tr>
<td>Yam</td>
<td>Sweet corn</td>
<td>French fries</td>
</tr>
<tr>
<td>Legumes</td>
<td>Popcorn</td>
<td>Pretzels</td>
</tr>
<tr>
<td>Lentils</td>
<td>Stoned Wheat Thins™</td>
<td>Rice cakes</td>
</tr>
<tr>
<td>Chickpeas</td>
<td>Ryvita™ (rye crisps)</td>
<td>Soda crackers</td>
</tr>
<tr>
<td>Kidney beans</td>
<td>Black bean soup</td>
<td></td>
</tr>
<tr>
<td>Split peas</td>
<td>Green pea soup</td>
<td></td>
</tr>
<tr>
<td>Soy beans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baked beans</td>
<td></td>
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</tr>
</tbody>
</table>
Exercise is medicine

- Fitness is one of the strongest predictors of all cause mortality
- Sedentary = smoking as a mortality predictor
- Two minute walk test, community ambulation good indicators of physical fitness
## Exercise barriers

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of knowledge of resources</td>
<td>Increase awareness among health care professionals of <strong>community resources</strong></td>
</tr>
<tr>
<td>Time constraints during physician-patient encounter</td>
<td>Involve a <strong>multi-disciplinary team</strong> of Physical Therapists, Diabetes Educators and Case Workers who can help motivate patients</td>
</tr>
<tr>
<td>Pre-existing or suspected heart disease</td>
<td>If patient wishes to take on activity <strong>more vigorous than walking</strong>, evaluate with a history and physical, resting ECG and possibly exercise ECG stress test.</td>
</tr>
</tbody>
</table>
Barriers - Prosthesis

What are some indicators of prosthetic candidacy?

- Cognition
- Cardiovascular health
- MSK - Contractures, strength
- Skin
- Bowel/bladder
- Transfers
Walking Alternatives

- Cycling
- Cycle ergometer
- Nu-step
- Water exercise
- Resistance training
Community Resources

• Community programs
  – Seated exercise, aquaexercise

• Outpatient Amputee Rehab Centres

• Accessible facilities and gyms
Exercise RX

• **150 minutes** moderate aerobic activity/week
• Resistance exercise **3 times** a week
  – Start: 10 min/day and increase to 30min +
  – Set goals - and **follow-up**
  – Have patient keep activity records
Self Management

• Patient participation in self-monitoring and/or decision making of their chronic illness

• Associated with improved risk factor modification
  • A1c, quality of life, weight loss and cardiovascular fitness
Flow sheets

- Encourage goal setting and barrier identification
- Prompt strategies for success and follow-up
- Associated with improved care and outcomes
- Use longitudinally to track progress
- Diabetes Canada and Provincial websites
<table>
<thead>
<tr>
<th>Name:</th>
<th>Type of diabetes:</th>
<th>Date of birth:</th>
<th>Date of diagnosis:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 1 ☐ Type 2 ☐ Other ☐</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Risk factors, co-morbidities**
- Hypertension ☐
- Dyslipidemia ☐
- Coronary Artery Disease ☐
- Peripheral Artery Disease ☐
- Chronic Kidney Disease ☐
- Mental health diagnosis ☐
- Poly cystic Ovary Syndrome ☐
- Foot disease ☐
- Fevillo Dysfunction ☐
- Smoking: [ ] (Date stopped: ) HR: ____________ Target Wt: ____________ Target BMI: ____________
- Alcohol: ____________ (Assess/discuss) ____________ Physical Activity (aerobic: 150 min/week; resistance: 2-3 times/week)

**Vaccinations**
- Flu (annual): Date: ____________ Date: ____________
- Pneumococcosis: Date: ____________

**Visits (Every 3 to 6 months):**

<table>
<thead>
<tr>
<th>Date</th>
<th>BP</th>
<th>Weight</th>
<th>A1C Target 27% or</th>
<th>Notes</th>
<th>Hypoglycemia</th>
<th>Antihyperglycemic Agents / CV protection agents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(ACEI / ARB / Statin / ASA as indicated)*</td>
</tr>
</tbody>
</table>

**Review SMBG records.** Target: pre-prandial 4-7 mmol/L; 2-hour post-prandial 5-10 mmol/L (5-8 mmol/L if A1C not at target)

**Screen for diabetes complications annually or as indicated**

<table>
<thead>
<tr>
<th>Nephropathy</th>
<th>Neutropathy</th>
<th>Retinopathy</th>
<th>Cad Assessment</th>
</tr>
</thead>
</table>
| Date | ACR | eGFR | Neutropathy
- Check for lesions and sensation (10-g monofilament or 128 Hz tuning fork)
- Check for pain, ED, GI symptoms
| Date | Findings |
| Date | Findings |
| Date | Findings |

**For vascular protection:**
- Statin use for 10 yrs or >30 yrs and >3 yrs duration OR end organ damage
- ACEI/ARB if <35 yrs OR end organ damage (even in the absence of hypertension)

<table>
<thead>
<tr>
<th>Lipids Targets</th>
<th>CAD Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicated to treat LDL-C ≤2 mmol/L</td>
<td>ECG:</td>
</tr>
<tr>
<td>Date</td>
<td>Medication</td>
</tr>
<tr>
<td>Date</td>
<td>Findings</td>
</tr>
</tbody>
</table>

See reverse side for care objectives and targets
Keys to SM success

• RE-INFORCEMENT:
  – Follow-up sessions
  – Patient-educator contact between sessions
  – Reminder systems
  – Tele-monitoring
  – Rewards
Effect of Home Blood Pressure Telemonitoring With Self-Care Support on Uncontrolled Systolic Hypertension in Diabetics


Abstract—Lowering blood pressure reduces cardiovascular risk, yet hypertension is poorly controlled in diabetic patients. In a pilot study we demonstrated that a home blood pressure telemonitoring system, which provided self-care messages on the smartphone of hypertensive diabetic patients immediately after each reading, improved blood pressure control. Messages were based on care paths defined by running averages of transmitted readings. The present study tests the system’s effectiveness in a randomized, controlled trial in diabetic patients with uncontrolled systolic hypertension. Of 244 subjects screened for eligibility, 110 (45%) were randomly allocated to the intervention (n=55) or control (n=55) group, and 105 (95.5%) completed the 1-year outcome visit. In the intention-to-treat analysis, mean daytime ambulatory systolic blood pressure, the primary end point, decreased significantly only in the intervention group by 9.1±15.6 mmHg (SD; P<0.0001), and the mean between-group difference was 7.1±2.3 mmHg (SE; P<0.005). Furthermore, 51% of intervention subjects achieved the guideline recommended target of <130/80 mmHg compared with 31% of control subjects (P<0.05). These improvements were obtained without the use of more or different antihypertensive medications or additional clinic visits to physicians. Providing self-care support did not affect anxiety but worsened depression on the Hospital Anxiety and Depression Scale (baseline, 4.1±3.76; exit, 5.2±4.30; P=0.014). This study demonstrated that home blood pressure telemonitoring combined with automated self-care support reduced the blood pressure of diabetic patients with uncontrolled systolic hypertension and improved hypertension control. Home blood pressure monitoring alone had no effect on blood pressure. Promoting patient self-care may have negative psychological effects. (Hypertension. 2012;60:00.)
NO CHANGE

- 9.1 mmHg systolic
- 4.6 mmHg diastolic
NO ADDITIONAL MEDS
NO ADDITIONAL VISITS
Apps for SM

mySugr: the blood sugar tracker made just for you
mySugr GmbH
Everyone

INSTALL
Contains ads • In-app purchases

500 Thousand Downloads 16,751 Medical
4.6 Similar

It’s never been easier to manage your diabetes and HbA1c – try it today!

READ MORE

Blood sugar and AIC at a glance!

Automatic blood sugar import

Accu-Chek Guide

bant
Simplifying Diabetes

One Drop - Diabetes Management
One Drop
Everyone

INSTALL

100 Thousand Downloads 841 Medical
4.3 Health & Fitness

Track all your diabetes data — Glucose, Meds, Food, and Activity — in one place.

READ MORE

Sunnybrook
ST. JOHN’S REHAB
Your New Goal

Seven day plan

Take at least 3 pre & post dinner blood glucose readings with photos of your meal.

Tap below to set or remove goal days:

Start This Goal

Your Points: 87

You need 100 points to redeem a reward!
The Medly Kit

- Patients record their symptoms and vital signs with a Bluetooth-enabled blood pressure cuff and weight scale
- Data transfers wirelessly with no manual input
- Medly transfers patient readings to the clinic and generates alerts
Conclusions

- Dysvascular amputation high morbidity and mortality
- Crucial to optimize modifiable risk factors
- Need to do better
  - Outcomes have not improved in decades
  - Maybe they can with new tools
• https://www.youtube.com/watch?t=18&v=2M1Rqwwq1lc
Acknowledgements

• Joe Cafazzo and UHN Healthcare Human Factors Team
References

- guidelines.diabetes.ca
- Schuyler Jones et al. High mortality risks after major lower extremity amputation in Medicare patients with peripheral artery disease, American Heart Journal, Vol 165, Issue 5, May 2013, 809-815