Sex and Gender Differences in Lower Extremity Amputation

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Overview

In the United States, nearly 200,000 amputations are performed each year, 71% percent of which are below-knee amputations (BKA).1 The most common reason for BKA is ischemia from peripheral artery disease (PAD), which often occurs in combination with diabetes. Sex and gender affect the epidemiology of as well as morbidity and mortality associated with lower extremity amputations (LEA).

Chief Complaint

“My amputation site has not healed for over a year and I am experiencing severe pain at and below the site”

History of Present Illness

Mrs. S is a 52-year-old woman with a history of left BKA who presents today with malaise, fever, chills, and ongoing severe pain at and below her left leg amputation site. The pain started three days ago and has become progressively worse. She describes it as a sharp pain that is worse with palpation. She also says that she feels phantom limb pain and endorses discomfort where her left heel used to be. Additionally, she has noticed brown/green drainage coming from an open wound at the amputation site. The patient underwent the amputation last year due to persistent deep vein thrombi in her left calf. Over the past year, the patient has been admitted multiple times with similar symptoms attributed to lower extremity cellulitis. She expresses frustration that the amputation site has not been healing properly over the past year. She denies fever, numbness, or weakness.

Medical History

Past Medical/Surgical History

- Past Medical History: hypertension, coronary artery disease/myocardial infarction, Factor V Leiden, deep vein thrombi in left calf, depression, alcohol use disorder, substance use disorder
- Prior Surgeries: left BKA, appendectomy
- Medications: atorvastatin, carvedilol, spironolactone, clopidogrel, omeprazole, duloxetine, gabapentin, quetiapine, trazodone, methadone

Family History

- Mother: Factor V Leiden, depression
- Father: coronary artery disease, stroke

Social History

- Unemployed and lives at home with parents
- Tobacco: ½ pack per day for 10 years
- Alcohol: remote history of heavy alcohol use
- Substance Use: remote history of cocaine use

Patient Assessment

Vital Signs

- HR: 89
- BP: 145/78
- Temp: 99.8 F
- O2 Sat: 98% on room air
- RR: 18

Physical Exam

- General Appearance: uncomfortable in bed
- Head: normocephalic, atraumatic
- Lungs: Breathing comfortably on room air
- Heart: Regular rate and rhythm
- Extremities: Open wound at left leg amputation site with associated brown/green drainage as well as erythema, induration, and tenderness. Warm and well perfused.
- Neuro: Alert and oriented. Moving all extremities equally.

Pertinent Labs

- WBC: 13.1
- Lactate: 2.1
- ESR: 35
- CRP: 31.59
- Blood Cultures: negative

Imaging

- Bedside Soft Tissue Ultrasound: no fluid collection
- CT Knee: no evidence of osteomyelitis in left knee
- Ultrasound Leg Left Venous: no evidence of deep venous thrombosis

Conclusion

The patient was admitted for lower extremity cellulitis and started on vancomycin. Surgery was consulted and decided that there was no need for acute surgical intervention.

Discussion

Nearly 200,000 amputations are performed each year in the United States, with 71% of these being comprised of BKA.[1] More than half of amputations are performed to treat complications of PAD. Studies have shown that sex and gender differences exist among amputees in terms of

epidemiology as well as morbidity and mortality. The incidence of below the knee amputations is almost twice as high in men compared with women.[2] On the other hand, mortality associated with this procedure may be higher for women as compared to men. One study showed that there were 37.7 deaths per 1000 amputations for women while there were 29.7 deaths per 1,000 amputations for men.[3] The etiology of this disparity is not known but it is thought to be due to the higher rate of cardiovascular deaths associated with amputations in women.[3] When race is brought into the picture, these disparities in outcomes expand.[1] For example, Black women are 7.6 times more likely to undergo amputation compared to women of other races.[4] This is likely due to factors such as increased incidence of PAD among this population, lack of access to preventive care, and social structures such as institutional racism that negatively impact healthcare quality.[5]

Men with diabetes are more likely to undergo LEA as compared to women with diabetes: the rate of LEA for patients with diabetes is 55 per 100,000 for men and 28 per 100,000 for women.[3] Men are also younger at the time of the procedure as compared to women.This may be because women develop vascular disease later in life than men due to the protective effects of estrogen.[6]

Although men are more likely to undergo amputation, women are more likely to have poorer outcomes. Phantom limb pain is a significant cause of morbidity in amputee patients, leading to discomfort and distress; studies have shown that women are more likely to report phantom limb pain.[7] The etiology of this gender difference is unknown. However, it is clear that sex and gender do impact pain perception as well as pain reporting. Women are more likely to overstate their pain to physicians in an effort to have their symptoms taken seriously.[8] On the contrary, men may be less forthcoming about the amount of pain and discomfort they are in due to societal expectations.[8]

With any amputation, patients experience significant psychosocial effects, and social expectations related to gender roles may influence these effects. For example, male amputees are more likely to express the negative impacts of the amputation on their sex lives and sexual functioning.[6] A study examining gender differences in psychosocial outcomes in patients that became amputees after the 2010 Haiti earthquake found that men were more likely to have worse psychosocial adjustment compared to women.[9]

While the precise etiology behind some of the sex and gender differences in amputation rates and outcomes is unknown, at least some of these differences can be attributed to biological and psychosocial factors. It is important for clinicians to be aware of these differences and their etiologies as they have implications on patient management and outcomes. For example, increased awareness could lead to improved interventions geared towards psychosocial adjustment tailored to men and women. Similarly, clinicians attuned to the increased risks certain populations face could be better equipped to manage these risks. Overall, understanding the impact of sex and gender on the outcomes of amputee patients is critical in attending to their physical and mental needs.

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