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### **Predictors of amputation above the knee in Brazilian health system**

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## Letter to the Editor

## Predictors of amputation above the knee in Brazilian health system



A therapeutic arsenal, including medical and surgical treatments, is at the disposal of vascular surgeons and angiologists for the treatment of peripheral atherosclerosis disease (PAD). Furthermore, there have been major improvements in endovascular surgical treatments in recent years aimed at ensuring limb viability and patient mobility; however, the impact of amputation and its psychosocial consequences is still very significant. This study aims to identify possible predictors of major amputation in patients with chronic critical lower limb ischemia (CLI) in Brazil.<sup>1</sup>

The study by Mantovani et al.<sup>2</sup> shows the importance of identifying the risk factors for amputation and guide more efficient public health strategies for the prevention of amputation in the Brazilian population.

Of the population of 182 patients, limbs were amputated in 66 and recovered in 116. Testing the association between amputation and the variables sex, smoking, SH, and stroke, it was found that amputations were more common among males (40.2%), smokers (37.2%), patients with SH (40.7%), and those with indicators of stroke (43.5%), ( $p = 0.237$ ,  $p = 0.714$ ,  $p = 0.239$ , and  $p = 0.441$ , respectively), without significant statistical difference. Previous amputation (62%,  $p < 0.001$ ), trophic lesion (41.2%,  $p < 0.018$ ), infection (54.5%,  $p < 0.001$ ), and CKD (67.7%,  $p < 0.001$ ) in the amputee group were statistically significant when compared with the non-amputee group. In a comparative analysis of the mean values of creatinine and hemoglobin A1C among the amputee and non-amputee groups, higher values were found for creatinine ( $3.64 \pm 2.3/1.76 \pm 1.70$ ) and hemoglobin A1C ( $7.79 \pm 0.96/5.5 \pm 1.28$ ) in the amputees, with statistical significance ( $p < 0.001$ ). Also in the amputee group, we found higher mean age ( $73.5 \pm 12.7$ ,  $p = 0.065$ ), hemoglobin ( $9.7 \pm 3.8$ ,  $p = 0.689$ ), triglycerides ( $142.7 \pm 55.4$ ,  $p = 0.233$ ), and fasting glycemic level ( $247 \pm 97$ ,  $p = 0.172$ ), without statistical significance. The non-amputees group had greater mean cholesterol HDL ( $50.9 \pm 8.8$ ,  $p = 0.568$ ), cholesterol LDL ( $150.9 \pm 35.09$ ,  $p =$

$0.715$ ), ABI ( $0.14 \pm 0.24$ ,  $p = 0.573$ ), and hospitalization time ( $13.9 \pm 11.3$ ,  $p = 0.655$ ), without statistical significance. Of the 66 amputees, one-third was due to gangrene occurring upon admission due to the unviability to the limb and two-thirds were due to a failed revascularization attempt. The follow-up time of these patients after hospital discharge in the group of amputees was  $3.71 \pm 2.4$  months and  $11.26 \pm 4.09$  months, in the non-amputee group. In the latter group, angioplasty and infra inguinal revascularization were the most conducted procedures, guaranteeing a rate of limb salvage of 63.73% in 18 months. The re-intervention rate in the amputee group was 10.6% as a result of surgical wound infections and 60.34% in the non-amputee group due to revascularization failure. The mortality rate was 9.89%, and the loss to follow-up was 6.04%. Of the cases of death, 72.22% were due to ischemic heart disease, 11.11% due to sepsis, 11.11% due to lung embolism and 5.56% for undetermined cause. Ten deaths occurred in the hospital, half of which occurred in patients who underwent amputation for gangrene and the other half in patients with CKD undergoing hemodialysis.

CLI continues to be a major health problem with high morbidity and mortality and functional incapacity of those who are able to stand on both legs rehabilitation. In our population, we observed that the predictors of risk for amputation are CAD, CKD, AA, increase of glycated hemoglobin, lack of previous care and previous amputation. Our data support some predictors of risk for amputation in patients with CLI (previous amputation, CAD, CKD, AA, increase in glycated hemoglobin and a lack of previous care), but the participation of other risk factors intrinsic to atherosclerotic disease cannot be ruled out, and the clinical state of these patients that, taken together, are determining factors for poor clinical outcomes, re-interventions, cardiovascular events, and limb amputation.<sup>3</sup> Further studies and larger follow-up time are necessary to define the real impact of the variables.

## Conflicts of interest

The authors have declared that no competing interests exist.

## References

1. Margolis DJ, Hoffstad O, Nafash J, Leonard CE, Freeman CP, Hennessy S, et al. Location, location, location: geographic clustering of lower-extremity amputation among medicare beneficiaries with diabetes. *Diabetes Care* 2011;**34**:2363–7.
2. Mantovani AM, Fregonesi CE, Palma MR, Ribeiro FE, Fernandes RA, Christofaro DG. Relationship between amputation and risk factors in individuals with diabetes mellitus: a study with Brazilian patients. *Diabetes Metab Syndr* 2017 Jan–Mar;**11**(1):47–50. <http://dx.doi.org/10.1016/j.dsx.2016.08.002>.
3. Ramos WB, Ywata De TCA, Roque AJ. Predictors of amputation in patients with critical lower limb ischemia. *J Diabetes Metab* 2016;**7**:714. <http://dx.doi.org/10.4172/2155-6156.1000714>.

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