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Direct cost of percutaneous Deep Vein Arterialization (pDVA) in an Italian Center

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INTRODUCTION

Percutaneous deep vein arterialization (pDVA) has recently been shown to provide a promising treatment alternative for patients with no-option chronic limb-threatening ischemia (CLTI) facing major amputation. Given the treatment opportunity, costs remain uncertain in this space. Exploratory cost-effectiveness analysis has been performed in the US by using CMS claim databases to quantify procedural costs and hospital stay. In Italy costs are not collected routinely, and central or regional databases do not exist.



AIM

The aim of this research is to estimate the Healthcare Resource Utilization (HRU) and average costs associated with a single limb pDVA procedure hospitalization conducted in a single center in Italy. pDVA related hospital costs will also be compared with the respective DRG reimbursement tariff associated to each hospital stay to explore efficiency in hospital care provision.

METHOD

This is a retrospective cohort study using hospital electronic records. The cohort included adult patients Rutherford class 5 and 6 and no available for an arterial surgical or endovascular revascularization, arterialized between 03/2019 to 08/2021 (index date). The clinical characteristics of the cohort have been detailed elsewhere. The only procedure conducted during the index procedure was pDVA with no further interventions being carried out. Costs at index hospitalization and Healthcare Resource Utilization (HRU) were evaluated using a standard costing approach using the hospital accounting system. Main cost categories considered in the analysis were: implantable and non-implantable material during procedure, length of procedure, hospital length of stay, lab testing and imaging in preparation and during hospital stay. Cost of services related to laboratory testing, only contained the material portion of the service, and did not include other costs associated (i.e.: physician portion of the service, nursing hours or tech time).

RESULTS

The cohort included 12 patients, 75% were men, and a total of 15 limbs (6 right and 9 left). Three patients were treated bilaterally but in a staged approach. The average age was 75 years. The average length of stay was 6.5 days, and the procedure time was 198 minutes. This includes two vascular surgeons, a radiologic technologist, and a hospital instrumentalist. In total ten units of blood transfusion were used to treat the 15 limbs. DRGs associated with the arterialization included DRG 554 'Other vascular procedures with complication without major cardiovascular diagnosis' (47%) and DRG 479 'Other procedures on the cardiovascular system without complications'.

The average lab testing costs was $315 \in$ per hospitalization ($117 \in$ before hospitalization and $198 \in$ during); the average costs for devices implantable and non-implantable was $9'246 \in$ and $3'907 \in$ respectively. The overhead costs of the operating room and the healthcare professionals involved totaled $1'597 \in$ per procedure. None of the patients needed intensive care units but only short intense observation after pDVA. The average cost per hospitalization to perform pDVA in a single limb was estimated at

16.800€ and the average DRG linked to the hospital at each hospitalization was 7.500€.

Clinical characteristics	N of patients (%)
Previous revascularization	14 (77,8%)
Hypertension	17 (94.4%)
Diabetes	13 (72.2%)
Hyperlipemia	7 (38.9%)
Heart disease	14 (77.8%)
Ejection Fraction	55%(±7)
Chronic renal disease	9 (50%)
GFR median (ml/min/1,73m2)	92.5 (±34.8)
Corticosteroid therapy	7 (38.9%)
Previous revascularization	14 (77,8%)

Resource consumptions	Mean value/limb
Operating-room	198.3 min (±53.7)
Blood transfusion	0.66 units
Covered stent	2.1(±0.63)
Intensive Care Unit	0
Hospital Length of stay	6.5 days
Resource consumption	Mean cost/limb
Lab tact	215 £
Ladiesi	512€
Implantable material	9.246 €
Non-implantable material	3.907€
Operating-room*	1.597 €



Total p-DVA costs = 16.800 €
Median DRG reimbursement = 7.500 €

Cost and reimbursement balance - 9.300 €

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CONCLUSIONS

pDVA is an expensive procedure and costs are mainly driven by material that need to be suitable for severe, heavily calcified stenotic and occluded anatomies that frequently extend below the ankle. However, based on literature data and on our experience, seems to be safe and effective in order to reduce major amputation in no-option CLTI patients therefore appropriate reimbursement should be in place to offer to eligible patients a treatment option to help wounds heal and reduce major amputation. Furthermore, our analysis is still ongoing to evaluate the "cost for healing limb". Preliminary analysis are encouraging, at 12 months follow up 60% of limbs are healed and patients are back to walk. The mean total cost of treatment is roughly 32.200€ and the mean reimbursement is 41.800€. To pursue the whole treatment to patient healing seems to be economic affordable also from the hospital perspective.

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