

Temporary vascular shunts in training programs for general surgeons

Derivaciones arteriales temporales en los programas de entrenamiento para los cirujanos generales

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Abstract

The skills development to address vascular trauma by general surgeons is important in hospitals in countries with a lack of vascular surgeons, so we agree the implementation of training programs in vascular surgery basic techniques for general surgeons. In Peru, through an exploratory survey, 43 public hospitals have at least one vascular surgeon, of which 20 are located in Metropolitan Lima, and 14 of the 26 regions of Peru have at least one public institution with vascular surgery capabilities. We recommend the incorporation of the transient arterial shunt technique as an alternative to vascular anastomosis due to its security and feasibility for general surgeons training programs.

Keywords: Vascular system injuries. Vascular surgical procedures. Anastomosis. Surgical. Simulation training.

Resumen

Es importante el desarrollo de habilidades por los cirujanos generales para abordar el trauma vascular en los hospitales de países con escaso número de cirujanos vasculares, por lo que coincidimos con la implementación de programas de capacitación en técnicas básicas de cirugía vascular para los cirujanos generales. En Perú, a través de una encuesta exploratoria, encontramos que 43 hospitales públicos cuentan con al menos un cirujano vascular, de los cuales 20 están ubicados en Lima Metropolitana, y 14 de las 26 regiones del Perú cuentan con al menos una institución pública con capacidades en cirugía vascular. Recomendamos la incorporación de la técnica de derivación arterial transitoria como alternativa a la anastomosis vascular debido a su seguridad y factibilidad para los programas de formación de cirujanos generales.

Palabras clave: Lesiones del sistema vascular. Procedimientos quirúrgicos vasculares. Anastomosis quirúrgica. Entrenamiento simulado.

Dear Editor,

We have read with interest the article by Salazar-Alarcón et al.¹ in which they report the results of the experience of a theoretical and practical course on vascular

anastomosis whose participants were mostly general surgeons. We welcome and congratulate this initiative, as we believe that it is important to have surgeons with the skills to treat vascular trauma in view of the scarce number of vascular surgeons in Peruvian hospitals.

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In relation to this problem, we report and discuss two aspects that we consider important regarding the limitations of human resources in the specialty and the proposal of an alternative surgical technique to vascular anastomosis for teaching it to general surgeons.

The situation of human resources in vascular surgery in Peru

Through an exploratory survey of physicians in the medium and high complexity hospitals of the Peruvian Ministry of Health and the Peruvian Social Security of Health, which are the two public systems that serve the country's civilian population, we compiled the number of specialists with accredited competencies in vascular surgery (which in Peru are thoracic and cardiovascular surgeons, cardiovascular surgeons and vascular surgeons, whom for the purposes of this report, will be referred to hereafter as "vascular surgeons") working in each of the hospitals.

It was found that 43 public hospitals have at least one vascular surgeon, of which 20 are located in Metropolitan Lima. Fourteen of Peru's 26 regional-level districts (better known as regions or departments) have at least one public institution with a vascular surgeon, shown in figure 1 on a concentration density map produced with ArcGIS Map 10.4. In terms of the number of specialists by region, Metropolitan Lima concentrates 138 (73%) of the country's vascular surgeons, followed by the Lambayeque region with 13 specialists (6.9%) and the La Libertad region with 11 specialists (5.8%), both located in the north of the country.

Even with the methodological limitations of this survey and in the absence of official public data on the availability of human resources in vascular surgery, we can affirm that there is a scarce supply of specialists in vascular surgery in most regions of Peru. The only official and verifiable data, although they do not necessarily reflect the real distribution of human resources, correspond to the National Registry of Specialists of the Peruvian Medical Association, which indicates that 66.4% are located in Lima, 6.1% in Arequipa, and 5.8% in Chiclayo.

The temporary arterial *shunt*

In the study by Salazar-Alarcón et al.¹, surgeons were trained to perform a vascular anastomosis and, according to their results, less than half of the participants achieved the competencies of learning this

surgical technique. However, the principle of peripheral arterial vascular trauma management is the rapid restoration of blood flow to prevent limb ischemia and thus avoid amputation, among other local and systemic complications².

Despite the importance of training in vascular anastomosis, the *shunt* or temporary arterial shunt³ represents a surgical alternative that is easier to operate, can be performed with resources accessible to most public hospitals and, if properly performed, can temporarily ensure distal perfusion of the extremities in patients with peripheral vascular trauma, thus allowing their transfer to an institution that has a specialist in vascular surgery.

Temporary vascular shunts consist of placing a conduit in the lumen of both arterial ends without the need for anastomosis, as a temporary procedure to ensure antegrade arterial flow to maintain distal perfusion, to be replaced by a permanent vascular graft or by primary anastomosis, either in the same surgical procedure or in a future intervention⁴. Specially designed products can be used for this purpose. Examples include Javid (Bard Peripheral Vascular, Inc.), Argyle (Cardinal Health, Inc.), and Pruitt-Inahara (LeMaitre Vascular Inc.) shunts, as well as "homemade" *shunts* using venous catheters, endotracheal tubes, feeding tubes, urinary catheters, or small-bore chest drainage tubes, secured by knotting with non-absorbable suture material, such as black silk or braided polyester, at both ends of the vessel^{2,4}. This technique is recommended in open extremity fractures with extensive soft tissue injury and concurrent arterial injury, with the need for reperfusion during complex revascularization for damage control, and it has been shown to be effective in reducing ischemia time, the need for fasciotomy, and the risk of amputation⁵.

In our opinion, the idea of preparing a general surgeon for the initial management of peripheral vascular trauma is very positive, given the limited number of vascular surgeons. However, we consider that, in order to achieve compliance with this competence in training programs, it is advisable to include this technique for all the advantages already mentioned. This measure may not be necessary in countries where there is a supply of vascular surgeons in all regions. However, in those where this gap is still wide, establishing it as the general surgeon's competence to perform initial and early management in peripheral vascular trauma becomes a necessity, and the temporary arterial *shunt* has proven to be a safe option to increase the chances of success.



Figure 1. Heat map of the density of public hospitals with vascular surgeons in Peru, as of June 2021.

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Conflicts of interest

The authors state they have no conflicts of interest.

Ethical disclosures

Protection of people and animals. The authors declare that no experiments were carried out on humans or animals for this research.

Data confidentiality. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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