

these narrow openings or slits. Because the perforating branches emerge from the inferior aspects of the body of the DNP and go directly into the tunica with little room to be mobilized, overt lateral traction during an effort to mobilize the nerve trunk laterally may cause traction injury to the delicate fibers or may even tear them off. Working through separate slits on each side of the dorsum of the penis by incising the Buck's fascia parallel to the branches of DNP (taking care about any anastomosing branches) will provide the surgeon with enough room to, for example, put the placation sutures without causing too much lateral traction on the nerve branches. In the case of incision or partial excision of a dorsal PD plaque, care must be given accordingly, but some degree of neural injury seems unavoidable.

The insult on the perforating branches may be a contributing factor to the postoperative erectile problems of patients operated on for dorsally located PD plaques, who already have some degree of erectile dysfunction (ED) preoperatively. The relationship between ED and PD is outlined in many studies and in classical textbooks. The exact pathophysiology underlying this relation is obscure, but venoocclusive effects are said to be main factor. The dynamic infusion cavernosometry and cavernosography showed venous leak as an etiologic factor for ED related with PD, but site-specific venous leak was not demonstrated.

A strong psychologic effect is also blamed as an etiologic factor for ED in PD patients.¹³⁻¹⁷ ED generally preceded the onset of PD in the above-mentioned studies. In our previous work, we demonstrated that during the operation on PD, as the area of the tunical defect widens (>3 cm), the postoperative rates of ED increase significantly.¹⁸ If the perforating branches have an additive role in the hemodynamics of erection, which is an entity amending more investigation, as the area of dissection under the NVB widens, there may be a contributing effect on the ED by means of an insult to more perforating branches. We do not know what happens to a trapped nerve fiber in PD while traveling through the tunica albuginea or up to which percentage the plaque should be calcified to destroy a perforating nerve, if this is also a contributing factor. The presence of perforating branches emerging from the DNP and the possibility that a PD plaque may destroy all the compartments of the tunical integrity (especially if it is calcified) brings out many more questions to be answered.

The major limitation of this study is that it has to be supported by animal models investigating the role of these perforating fibers on the stimulation of the cavernous smooth muscles. This was obviously not possible on a cadaveric model, but the fibers are there to be understood in more detail.

CONCLUSIONS

The exact anatomic knowledge of the DNP is mandatory during penile reconstructive surgeries. The detailed

information about the far lateral positioning of the nerves entering the glans penis, the anastomosing branches between the trunks of the DNP, and particularly, the presence of branches emerging from the inferior aspects of the DNP that perforate the tunica albuginea are the important findings of this cadaveric study that must be taken into consideration during penile reconstructive surgeries.

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EDITORIAL COMMENT

This is a very important study on the anatomy of the dorsal nerves and its branches. The branches emerging from the main

trunks perforating the tunica albuginea into cavernous tissue were observed in 72.7% of cases, and in 27.3%, no perforating branches could be identified. These findings should be evaluated clinically in physiologic studies in the future for a better dissection and elevation of the neurovascular bundle (NVB) in reconstructive surgery.

Lateral branches were more often at the proximal shaft (77%-86%) than at the distal shaft (19%-23%) suggesting that it is relevant during NVB dissection to preserve the lateral branches not only on the distal shaft but also on the proximal shaft.

The preservation of distal and proximal lateral branches during NVB dissection should be mandatory to maintain ejaculatory function and probably to preserve erectile function. The distal dissection of the NVB by everting the glans and preservation of lateral branches should be recommended.

According to the distribution of anastomosing nerve branches at the dorsal side of the penis, it is recommended that the dissection of the NVB should not be performed through a midline incision and removal of the deep dorsal vein, because this may cause additional trauma to the branches of the NVB. The dissection of the NVB by 2 paraurethral incisions on Buck's fascia seems to be the most effective way to preserve the anatomic distribution of the NVB.¹⁻³

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REPLY

We thank Dr. Egydio for his comments. These are the findings of a cadaveric anatomic study and need to be supported with animal models that electrophysiologically investigate the role of these perforating branches inside the corpora cavernosa, as we have mentioned in our study. We are currently planning and working on the setup of the animal model on this topic. We believe that after the verification of the role of these perforating fibers on the hemodynamic process inside the corpora cavernosa, the procedure of elevation of the neurovascular bundle might need some modifications, and a recommendation about the safest route to reach the dorsal aspect of the tunica albuginea will be more valid. Until then, we believe that the safest route to reach the dorsal aspect of the tunica albuginea is to go midline through the neurovascular bundle and work in the narrowest area possible ("slits" or "openings") to cause the minimum insult.

Lateral branching of the dorsal nerve of the penis is important for the preservation of the ejaculatory function specifically,¹ but the above-mentioned criteria must be fulfilled to talk about an exact role in the erectile functions.

We share the important recommendation in the Comment about everting the glans penis to preserve the lateral branches.

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