Gangrene of the Hand Following a Haemodialysis Access: Lessons to be Learnt

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Abstract Renal replacement therapy is a “way of life” for patients with chronic kidney disease (CKD), and haemodialysis forms their “lifeline”. Haemodialysis access, via a small surgery, to anastomose an artery and a vein in the arm or forearm, is the universally accepted standard of care. However, even this minor surgical intervention can lead to devastating complications without adequate pre-operative evaluation and apt intra-operative decision making. The following article pictorially exemplifies the most dreaded complication of a gangrenous hand as well as highlights the lessons to be learnt, in order to avoid this infirmity.

Keywords Hand gangrene · Haemodialysis access · Arteriovenous fistula · Vascular steal

Renal replacement therapy is a “way of life” for patients with chronic kidney disease (CKD), and an arteriovenous fistula (AVF) forms the “lifeline” for haemodialysis access in them [1, 2].

An AVF, though a simple procedure, has its own set of complications, with hand or distal limb gangrene being the most devastating (Figs. 1 and 2).

As per the literature, hand ischaemia is seen in approximately 1 in 500 cases, symptomatic ischaemia in 10–25 %

of patients with brachio-cephalic and brachio-basilar fistulae, 4–6 % at the level of the forearm and 1–2 % at the radio-cephalic level [3, 4].

Multiple macro- and microvascular conditions such as advanced age, diabetes mellitus, proximal and distal atherosclerosis and recurrent post-dialysis hypotension have been enunciated as aetiologies [3]. A “vascular steal” phenomenon due to increased blood flow through a dilated blood vessel with a lack of collateral circulation has also been postulated [3]. Management involves timely endovascular or open surgery to avoid loss of limb or infirmity [4].

Lessons to be learnt in order to avoid this devastating complication include the need to obtain a colour doppler routinely pre-operatively so that any stenotic lesion may be dealt with prior to surgery [1]. The doppler must report on the vessel wall condition, its intima, calibre, as well as condition of concurrent collaterals. Clinical examination via an Allen’s test may be a surrogate indicator towards the same [1].

Lastly, surgical precision, with a 90–180° anastomotic angle; arteriotomy of less than 7 mm; and adequate dissection of vessels from soft tissue sheaths may help to avoid this devascularising condition [4].

In the absence of radiological support, it may be worthwhile to avoid operating at the brachial end during the same

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Fig. 1 Distally gangrenous hand, with arrowhead showing the radial AVF attempt site

Fig. 2 Gangrenous hand after failed AVF surgery

sitting, in case of a failed radial anastomosis or poor vessel condition discovered intra-operatively.

Thus, we must remember the age-old phrase “*prevention is better than cure*” to prevent a simple surgery from going incapacitatingly astray.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

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