Increased Flow Rates Through Use of Perforated Fistula Needles

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A study was done to determine means to optimise flow through needles inserted in the arterialised vein of an internal A-V fistula. Flow data were correlated with both positive and negative pressure values, in vivo and in vitro.

The following conclusions were reached:

a  Poor flow is most often related to a valve-like interaction between the vessel wall and the bevel of the needle (Figure 1).

b  Plastic cannulae with a blunt bevel have much less tendency to the valve action (Figure 1).

Figure 1. Relation of vessel wall to various cannula bevels
Similar cannulae (Figures 2 and 3) made from various lengths of teflon — and with lateral perforations near the tip were evaluated, with the following findings:

1. In vitro: flow characteristics are not significantly different from cannulae without perforations.
2. In vivo: optimal flow is consistently obtained, with minimal negative pressure.

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