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TITLE : A COMPARISON OF METHODS OF RADIAL ARTERY CANNULATIONS
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Introduction. Percutaneous radial artery cannulation is performed to permit continuous monitoring of systemic arterial blood pressure and to facilitate repeated sampling of arterial blood. Two methods of cannulation are used, transfixing and direct threading, in which the posterior wall of the artery is not punctured. The purpose of the study was to compare the effect of the method of cannulation on post cannulation blood flow and thrombus formation.

Method. The study was approved by the committee to review grants for clinical research and investigation involving human beings. All patients in the study were scheduled for open heart surgery and were seen the day prior to surgery when radial and ulnar artery blood flow were assessed in both wrists using Richard's modification of Allen's test^{1,2}. The time in seconds to the appearance of a capillary flush was noted for both arteries in each wrist. Graphical recordings of flow were obtained using a Doppler ultrasonic flow meter. Any patient with reduced ulnar artery flow as indicated by either an Allen's test in excess of five seconds or an attenuated ultrasonic flow recording, was excluded from the study. Wrist diameter, in centimeters, was measured at the level of the ulnar styloid. Cannulation was performed aseptically by one of two anesthesiologists, each an expert at one particular technique, the method of cannulation being randomized. 20 ga non-tapered teflon catheters (Abbocath) were used and the number of attempts at cannulation recorded. During the postoperative period the cannula was flushed using a continuous flushing device (Intraflo). Decannulation was performed using proximal and distal pressure and suction to remove any luminal clot³, pressure being maintained at the site of decannulation for five minutes. After decannulation, blood flow was assessed at 1 hour and at 5 days by an investigator who had seen the patient prior to surgery, but who did not know the method of cannulation. Allen's test was performed and an ultrasonic flow meter reading obtained 1 cm distal to the cannulation site, at the level of cannulation and 1 and 5 cms proximal to this level. Any patient who had experienced periods of hypotension, requiring inotropic support during the postoperative period, was excluded from the study. After decannulation, vessel blood flow was divided into three groups according to the following criteria:

- (1) No change in flow. No prolongation of Allen's test, and no evidence of attenuated flow from ultrasonic recordings
- (2) Reduced flow. Prolongation of Allen's test (but less than 15 seconds) with evidence of attenuated flow from ultrasonic recordings.
- (3) No flow. Allen's test longer than 15 seconds and no evidence of flow on ultrasonic recordings.

Results. Wrist diameter, duration of cannulation and number of attempts at cannulation were not significantly different in the two groups (Table 1).

Of the vessels cannulated by transfixing, 17 of 19 showed no reduction in blood flow 1 hour or 5 days after decannulation. Two showed reduction in flow after 1 hour but flow was normal after 5 days (Table 2). Of the vessels cannulated by direct threading, 14 of 17 showed no reduction in blood flow 1 hour or 5 days after decannulation. Two showed no flow after 1 hour and another reduced flow. The

latter showed normal flow after 5 days while both the former showed reduced flow after 5 days. There was no significant difference in flow between the two groups nor were there any serious sequelae or instances of frank ischemia.

Discussion. Both methods of cannulation have been described⁴, with direct threading being recommended as the method of choice⁵. Nevertheless, transfixion is commonly practiced. Our data suggests that this technique carries no additional risk of postcannulation vessel thrombus formation.

References.

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TABLE 1: MEAN VALUES (±S.D.)

	TRANSFIXED (N=19)	DIRECT THREADING (N=17)	P
Duration of cannulation (hrs) (±24.49)	63.88	63.02 (±36.18)	.93
Wrist diameter (cms) (±1.46)	16.84	16.53 (±1.17)	.52
Attempts at cannulation (±1.05)	1.68	1.52 (±1.61)	.74

TABLE 2: POST-CANNULATION BLOOD FLOW

	TRANSFIXED (N=19)	DIRECT THREADING (N=17)
1 hour*		
No change	17	14
Reduced	2	1
No Flow	0	2

5 days†		
No change	19	15
Reduced	0	2
No Flow	0	0

*x² = 2.54, P>0.05; †x² = 2.38, P>0.05