

## THERAPEUTICS

# Femoral venous catheterization was associated with increased risk for infection and thrombosis in critically ill patients

Merrer J, De Jonghe B, Golliot F, et al., for the French Catheter Study Group in Intensive Care. Complications of femoral and subclavian venous catheterization in critically ill patients. A randomized controlled trial. *JAMA*. 2001 Aug 8;286:700-7.

## QUESTION

In patients receiving intensive care, is femoral venous catheterization associated with greater rates of complication than subclavian venous catheterization?

## DESIGN

Randomized (allocation concealed\*), blinded (2 outcome assessors)\*, controlled trial.

## SETTING

8 intensive care units (ICUs) in France.

## PATIENTS

293 patients who were receiving their first central venous catheterization during the index ICU stay. Exclusion criteria included a moribund state, emergency catheterization, coagulopathy, severe hypoxemia, skin lesions or recent surgery at either site, and phlebitis. Catheterization was attempted in 289 patients (mean age 61 y, 66% men). 99%, 92%, and 76% of patients were evaluated for mechanical, infectious, and thrombotic complications, respectively.

## INTERVENTION

146 patients were allocated to central venous catheterization with a polyurethane standard central catheter (15 or 16 cm long) at the femoral site (femoral group), and 147

patients were allocated to the same treatment at the subclavian site (subclavian group). Physicians were allowed to switch from one side to the other if the first attempt was unsuccessful. Maximal sterile-barrier precautions were taken during the operation.

## MAIN OUTCOME MEASURES

Incidence of mechanical (e.g., arterial puncture, pneumothorax, hemothorax or mediastinal hematoma, and misplacement of the catheter tip), infectious, and thrombotic complications.

## MAIN RESULTS

Analysis was by intention to treat. The incidence rates of infectious and thrombotic complications (thrombotic complications were evaluated in only 76% of patients) were greater in the femoral group than in the subclavian group (all *P* values < 0.001) (Table).

The groups did not differ for incidence of overall mechanical complications (*P* = 0.74) (Table); however, pneumothoraces occurred in 4 (2.7%) of the subclavian insertions, and 2 major hematomas (1.4%) occurred in the femoral group.

## CONCLUSION

In patients receiving intensive care, femoral venous catheterization was associated with a greater rate of infectious and thrombotic complications and a different pattern of major mechanical complications than was subclavian venous catheterization.

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\*See Glossary.

### Catheter-related complications for femoral vs subclavian venous catheterization in critically ill patients†

Outcomes at 9 to 32 mo	Femoral vein	Subclavian vein	RRI (95% CI)	NNH (CI)
Infectious complications	18.5%	4.1%	353% (99 to 946)	7 (5 to 14)
Thrombotic complications‡	17.1%	1.4%	1158% (240 to 4651)	7 (5 to 11)
			RRR (CI)	NNT
Mechanical complications	17.1%	18.4%	6.8% (-51 to 42)	Not significant

†Abbreviations defined in Glossary; RRI, RRR, NNH, NNT, and CI calculated from data in article.

‡Thrombotic complications evaluated in only 76% of patients.

## COMMENTARY

The study by Merrer and colleagues bolsters our collective anecdotal experiences about the risks and benefits of femoral and subclavian venous catheter insertion. Femoral catheters are more likely than subclavian catheters to become infected and are more likely to cause thrombosis in the vein into which they were inserted. More complications are observed when central venous catheters of any kind are placed during the night (troublesome to insert) and when placed by less experienced operators (inferred by more complications at 2 of the 8 study institutions).

More detailed information about the differences in previous practice patterns among the institutions in this study would be interesting because central venous catheter insertion tends to be parochial. Our practice is largely determined by where we trained, when we trained, with whom we trained, and our experiences during and after that training. Switching to the subclavian approach on the basis of this

study's results without adequate training and supervision is inappropriate. The risk for major and immediate complications with the subclavian approach is substantial, and although not usually life threatening, sequelae clearly exist for the patient, with possible risk for recrimination of the operator. The risks associated with the femoral approach, on the other hand, are almost exclusively delayed and manageable by prompt removal of the catheter. Thus, one pragmatic approach would be for relatively inexperienced operators to use the femoral approach if a more experienced operator is not at hand to supervise the insertion of a subclavian catheter. Depending on the ongoing need for a central catheter at a later time, the insertion site may be then changed.

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