Healthcare Innovations
How practice has changed

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Integrated versus non-integrated peripheral intravenous catheter in hospitalised adults (OPTIMUM) study: A randomized controlled trial

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PURPOSE

To compare **integrated** peripheral intravenous catheters (PIVCs) and **non-integrated PIVCs** for the prevention of **device failure**.

METHOD

Medical/surgical adult patients requiring intravenous therapy for >24 hours were enrolled between July 2017 and December 2019. Patients were randomised to either **integrated** (*n*=881) or **non-integrated PIVC** (*n*=878). One PIVC was studied per patient.

Randomised, controlled, superiority, non-blinded trial | RBWH, PAH, and QEII hospitals | 1,759 randomised patients | 1,710 (97%) received a PIVC

The primary outcome was **device failure**, a composite of occlusion, infiltration, phlebitis, dislodgement, and local/bloodstream infection. Secondary outcomes included failure type, first-time insertion success, tip colonisation, insertion pain, dwell time, mortality, hospital costs, and health-related quality of life. Clinician and patient satisfaction were measured in a subset.

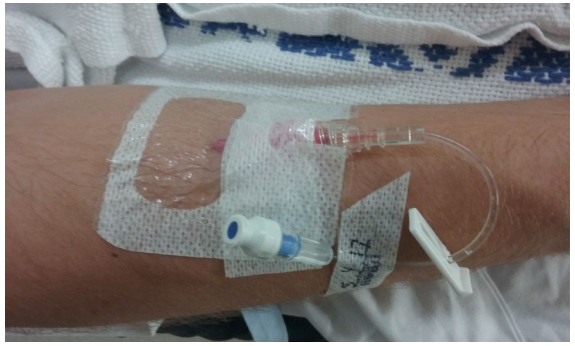
KEY FINDINGS

	Integrated PIVC	Non-integrated PIVC
Device failure[ns]	33%	35%
Failure/1,000 device-days*	124	145
Dislodgement/leakage*	39	53
Hospital costs[ns]	$40 per patient	$38 per patient

* $p < .05$; [ns] no significant difference

RESULTS

Among **1,759 randomised patients** (mean [SD] age, 60 [17] years, 60% male, 70% multiple comorbidities), 1,710 (97%) received a PIVC and were included in the modified intention-to-treat analysis.



Device failure was less common in non-integrated PIVCs (absolute risk difference -2.8% (95% CI -7.3% to -1.7%). However, integrated PIVCs had significantly longer dwell, and less dislodgement/leaking (both $p<0.05$). The multivariate model found **significantly reduced PIVC failure for integrated PIVCs** (HR 0.82, 95% CI 0.69 to 0.96) adjusted for gender, baseline infection, gauge, department, and insertion site. There was **no significant difference in direct hospital costs** ($2.02 (95% CI $-8.86 to $4.81).

CONCLUSIONS

Integrated PIVCs resulted in a relative 18% less PIVC failure than non-integrated PIVCs in hospitalised adult patients. This could reduce burden of treatment interruptions and re-insertion procedures.