

Endoscopic Versus Open Treatment of Carpal Tunnel Syndrome: Postoperative Complications in patients with Diabetes Mellitus

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Introduction

- **Type 2 diabetes mellitus (T2DM)** is a risk factor for carpal tunnel syndrome (CTS).
- Patients with T2DM often have higher postoperative complication rates.
- Limited data exist regarding outcomes in T2DM patients undergoing carpal tunnel release (CTR).
- Surgical management of CTS can be performed via endoscopic (ECTR) or open (OCTR) technique.
- The **purpose** of our study was to compare complication rates between ECTR and OCTR in patients with T2DM.



Open Carpal Tunnel Release Surgery

Single Portal Endoscopic Carpal Tunnel Release Surgery

Double Portal Endoscopic Carpal Tunnel Release Surgery

Methods

- The **TriNetX** database was used to perform a retrospective cohort study of 67,225 patients with T2DM who underwent ECTR (n = 17,792) or OCTR (n = 49,433).
- Demographic data, medical comorbidities, and complication rates were analyzed.
- A 1:1 propensity-score match was performed to calculate risk ratios and 95% confidence intervals of our **primary outcomes** which included intraoperative median nerve injury as well as 6-week wound dehiscence and infection.

Table 1. Matched Demographics of Patients With Type 2 Diabetes Mellitus Who Underwent Endoscopic Versus Open Carpal Tunnel Release

	ECTR n=13,956		OCTR n=13,956		P-value
	Mean	SD	Mean	SD	
Demographics					
Age	61.5	-12.8	61.5	-12.8	0.994
Sex					
Male	5,202	37.27%	5,221	37.41%	0.814
Female	8,754	62.73%	8,735	62.59%	0.814
Comorbidities					
Congestive heart failure	1,276	9.14%	1,251	8.96%	0.602
Atrial fibrillation/flutter	1,070	7.67%	1,065	7.63%	0.91
Peripheral vascular disease	841	6.03%	763	5.47%	0.045
Hypertension	9,100	65.20%	9,285	66.53%	0.020
Paralysis	98	0.70%	85	0.61%	0.335
COPD	1,455	10.43%	1,446	10.36%	0.86
Hypothyroidism	2,243	16.07%	2,342	16.78%	0.11
Chronic kidney disease	1,387	9.94%	1,410	10.10%	0.647
Liver disease	1,562	11.19%	1,523	10.91%	0.457
Peptic ulcer disease	228	1.63%	259	1.86%	0.156
Lymphoma	195	1.40%	209	1.50%	0.483
Metastatic cancer	276	1.98%	297	2.13%	0.375
Nonmetastatic cancer	374	2.68%	385	2.76%	0.686
Rheumatoid arthritis	702	5.03%	648	4.64%	0.132
Coagulopathy	763	5.47%	821	5.88%	0.134
Fluid and electrolyte disorders	2,028	14.53%	2,214	15.86%	0.002
Chronic blood loss anemia	250	1.79%	302	2.16%	0.025
Iron deficiency anemia	908	6.51%	958	6.86%	0.231
Alcohol abuse	63	0.45%	55	0.39%	0.461
Drug abuse	244	1.75%	237	1.70%	0.748
Psychoses	196	1.40%	218	1.56%	0.276
Depression	3,506	25.12%	3,503	25.10%	0.967
Smoking	519	3.72%	491	3.52%	0.370
Obesity	5,700	40.84%	5,690	40.77%	0.903

Table 2. Matched Postoperative Outcomes of Patients With Type 2 Diabetes Mellitus Who Underwent Endoscopic Versus Open Carpal Tunnel Release

Matched Outcomes	T2DM Endoscopic CTR (n = 17,792)		T2DM Open CTR (n = 17,792)		Risk Ratio	95% Confidence Interval	P-value
Wound infection	185	1.04	323	1.82	0.57	0.48–0.69	<0.001
Median nerve injury	21	0.12	50	0.28	0.42	0.25–0.70	<0.001
Wound dehiscence	63	0.35	131	0.74	0.48	0.36–0.65	<0.001

Results

- Prior to matching, univariate analysis revealed that the ECTR cohort had significantly lower rates of 90-day wound infection and wound dehiscence, as well as intraoperative nerve injury (all $P < .001$) than the OCTR cohort.
- After matching, a significantly greater number of ECTR patients had liver disease ($P = <.001$) and a BMI > 40 ($P = .001$) compared to the OCTR group.
- These patients also had a lower incidence of fluid and electrolyte disorders ($P = .003$).
- Patients with T2DM who underwent ECTR had a significantly lower relative risk of 6-week wound infection, 6-week wound dehiscence, and median nerve injury (all $P < .001$) when compared to patients who underwent OCTR.

Conclusion

- T2DM patients undergoing CTR, ECTR yielded significantly lower rates of wound infection, wound dehiscence, and nerve injury within 6-weeks post-surgery, reducing the risk by 43%, 52%, and 58%, respectively.
- ECTR may be preferable to OCTR for individuals with T2DM undergoing CTR, as it demonstrates a reduced risk of wound infection, wound dehiscence, and median nerve injury in the first 6 weeks after surgery. Adopting ECTR in this patient population may lead to improved CTR outcomes in patients with T2DM.