High Mini-Skin Incision during Carotid Endarterectomy for Carotid Stenosis

Junwoo Cho,
Daegu Catholic University Medical Center

Introduction

- Carotid endarterectomy (CEA) is a treatment option for carotid stenosis.

- The conventional incision in CEA is approximately 10–15 cm along the anterior border of the sternocleidomastoid muscle.

- Larger incision results in higher rates of cranial and cervical nerve (CCN) injuries.

Review of previous studies

ELSEVIER

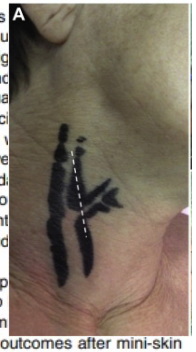
Check for updates

Clinical Research

Mini-Skin Incision for Carotid Endarterectomy: Neurological Morbidity and Health-related Quality of Life

Gianmarco de Donato, Edoardo Pasqui, Claudia Panzano, Massimiliano Walter Guerrieri, Domenico Benevento, Alessandro Cappelli, Carlo Setacci, and Giancarlo Palasciano, Siena, Italy

Background: Cranial and cervical nerve (CCN) injury is recognized as
after carotid endarterectomy (CEA), which may result in minor local neu
significant discomfort for the patient. The aim of this study is to investig
skin incision (<5 cm) on the CCN injury after CEA in comparison to stanc
of 12–15 cm in a high volume center, and to evaluate health-related qua
comes in those patients who had undergone both types of the skin inci
Methods: From January 2013 to December 2019, 446 CEAs (47.3%)
a standard neck incision of 12–15 cm (group A), while 496 (52.7%) we
mini-skin incision (<5 cm) (group B). Sixty-two patients underwent standa
side and mini-skin incision on the other side (subgroup B). The main o
stroke, death, CCN injuries, cervical hematoma rates, and reintervent
assessed at baseline and after 30 days using Medical Outcomes Stud
disease-specific modified Likert scales.
Results: The stroke and death rate at 30 days was 1.12% in group
($P = 1$). The incidence of CCN deficits was significantly lower in group
to group A (13.4%) ($P < 0.001$). The cervical hematoma was more com
sion (4.9% vs. 1.2%, $P = 0.02$). HRQOL at 1 month showed that the outcomes after mini-skin incision were significantly better for less difficulty with eating/swallowing and neck pain ($P < 0.01$).
Conclusions: CEA through a small incision (<5 cm) may reduce CCN complications without additional perioperative neurologic risks. As validated by patients with bilateral disease who experienced both surgical techniques, mini-skin incision is also associated with better HRQOL at 1 month, particularly with regard to eating/swallowing and neck pain.

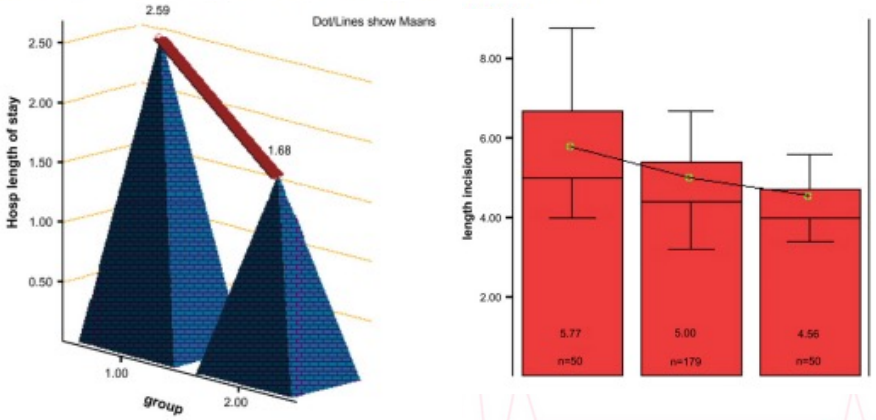


A Short Incision for Carotid Endarterectomy Results in Decreased Morbidity

E. Bastounis, C. Bakoyiannis,* C. Cagiannos, C. Klonaris, C. Filis, E.E. Bastouni and S. Georgopoulos

First Department of Surgery, University of Athens Medical School, "Laiko" General Hospital, Athens, Greece

Objectives. *To investigate the effect of a short incision (<5 cm) on the complication rate of the carotid endarterectomy (CEA).*
Design. *A retrospective cohort study.*
Patients and methods. *From January 1994 to December 2005, 874 patients underwent 1048 primary carotid endarterectomy (CEA) procedures. Seven hundred and sixty nine operations were performed through a long neck incision (group A), while 279 were performed through a smaller incision (<5 cm) according to a standard protocol (group B). Preoperative and postoperative cranial nerve assessment was completed on all patients. The main outcome measures were stroke, death, cranial and cervical nerve injuries rates.*
Results. *The 30-day mortality rate was 0.26% in group A and 0.35% in group B (p = .792). The stroke rate was 0.13% and 0% in group A and B respectively (p = .839). The mean length of stay was 2.59 days in group A and 1.67 days in group B (p < .0001). In group A the overall incidence of motor and sensory nerve deficits was 13.5% (104 CEA, 92 patients) but in group B 2.9% (8 CEA, 7 patients, p < .0001, odds ratio [OR] 0.189, 95% confidence interval [CI] 0.091–0.393).*
Conclusions. *Carotid endarterectomy through a small incision is a feasible and safe approach that provides cosmetic results and fewer nerve complications without compromising the safety of the procedure.*



ATCSA2023
Ho Chi Minh city, Vietnam

Review of previous studies

Vascular Specialist International
Vol. 35, No. 3, September 2019
pISSN 2288-7970 • eISSN 2288-7989

Original Article

Outcomes after Transverse-Incision 'Mini' Carotid Endarterectomy and Patch-Plasty

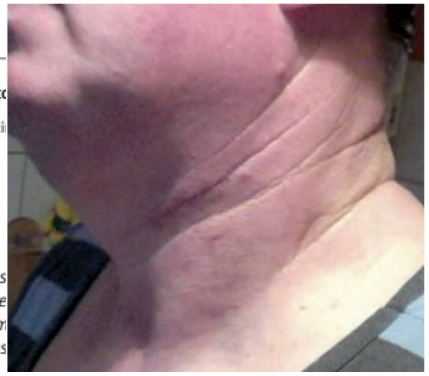
Sidhartha Sinha, Matthew Fok, Aaron Goh, and Vijay M Gadhvi
Department of Vascular Surgery, Basildon Hospital, Basildon, England

Received April 23, 2019
Revised August 13, 2019
Accepted August 14, 2019

Purpose: Traditional exposure for carotid endarterectomy (CEA) involves making a longitudinal incision parallel to the anterior border of the sternocleidomastoid. Such incisions can be painful, aesthetically displeasing, and associated with a high incidence of cranial nerve injury (CNI). This study describes the outcomes of CEA performed through small (<5 cm long), transversely oriented incisions located directly over the carotid bifurcation, as identified by color-enhanced Duplex ultrasound.
Materials and Methods: Patient demographics and operative data were collected retrospectively from an in-house database of consecutive vascular patients undergoing CEA with a small transversely oriented incision for both symptomatic and asymptomatic carotid artery stenoses.
Results: A total of 52 consecutive patients underwent CEA between 2012 and 2016 (median age, 73.5 years; interquartile range, 67-80.3; male/female ratio, 40:12). CEA was performed under regional/local anesthesia (LA) in 48 (92.3%) patients, with 4 (7.7%) being performed under general anesthesia. One patient under LA experienced neurological dysfunction intraoperatively (manifesting as an inability to count out loud) that resolved with insertion of shunt. One patient experienced a transient neurological event (expressive dysphasia) within the immediate postoperative period, which resolved within 6 hours. No in-hospital death or perioperative major adverse cardiovascular events were noted. No persistent CNIs nor bleeding complications necessitating re-exploration were reported. Follow-up data were available for a median period of 3.1 years and for all patients. Three patients experienced strokes following discharge (2 strokes contralateral to and 1 transient ischemic attack ipsilateral to the operated side).
Conclusion: Small, transversely orientated incisions, hidden within a neck skin crease can be safely performed in the majority of patients undergoing CEA.

Key Words: Carotid endarterectomy, Carotid artery stenosis, Vascular surgical procedure, Outcome assessment

Cosmetic effects of skin-crease camouflage incision versus longitudinal incision following carotid endarterectomy



Arkadiusz Kazimierczak, Anita Rybicka, Pawel Rynio, Piotr Gut
Department of Vascular Surgery, Pomeranian Medical University, Szczeci

Abstract

Introduction: *Despite the increasing use of carotid angioplas nonetheless remains a more medically beneficial method of tre sibility for progress within this procedure may be to use minim is in plain sight: the use of the natural wrinkles (skin crease) as cosmetic improvements.*
Aim: *To compare the cosmetic effects of classic and trans-wrinkle CEA. To assess the distance between the carotid artery bifurcation (CAB) and the skin-crease incision whilst attempting CEA.*
Material and methods: *It was a randomized prospective study with two groups: patients undergoing classic surgery (control group; n = 100) and skin-crease trans-wrinkle camouflaged CEA (study group; n = 100). Follow-up was at 2 months and 1 year.*
Results: *The medical results of the treatment were similar in both groups. The cumulative count of strokes and myocardial infarctions was 0.5% within 30 days, and after one year 3.5% (and 5.5% including cases of death). The superiority of the transverse crease being hidden compared to the conventional longitudinal technique was proven in the Patient and Observer Scar Assessment Scale (POSAS) score, respectively 11.4 ±1.0 vs. 14.1 ±3.4 (p = 0.0001) after 2 months and 13.5 ±2.8 vs. 14.1 ±3.4 (p = 0.039) after a year.*
Conclusions: *Trans-wrinkle incision gives better cosmetic results, can be safely performed in most cases, and offers a comfortable approach during CEA.*

Key words: *carotid endarterectomy, skin-crease incision, randomized control study, scar assessment.*

ATCSA2023
Ho Chi Minh city, Vietnam

Introduction

- Minimally invasive surgery techniques have been investigated to minimize trauma, complications, and hospital stays, and to improve esthetic results.

- A mini-skin incision has a narrower view of the neck anatomy, making it more difficult to target the carotid stenosis lesion in general.

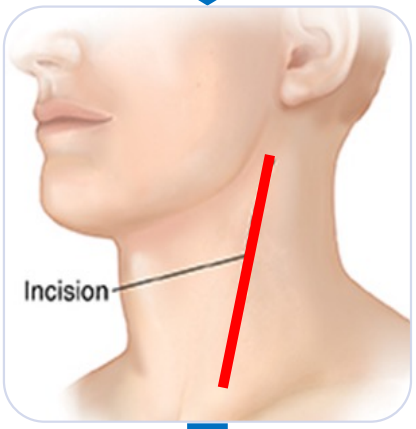
- This study aimed to evaluate whether high vertical mini-incision (HMI) provided operative advantages and positive early postoperative outcomes by focusing on CCN injuries, operative times, and esthetic satisfaction.

Introduction

- A retrospective study: March 2015 to December 2022 at single medical center in South Korea with follow-up until August 2023.
- We performed CEA in both incision groups using cerebral oximetry to monitor cerebral perfusion during surgery.
  - rSO2 dropped below 80% of the baseline value, an intraluminal shunt catheter was inserted
- All incisions in both groups were done without ultrasonographic mapping.

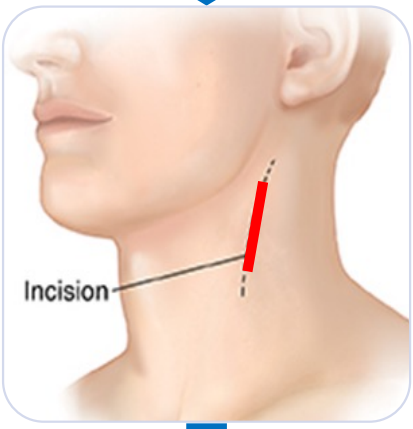
Study design

Conventional incision



N: 110

High mini-skin incision



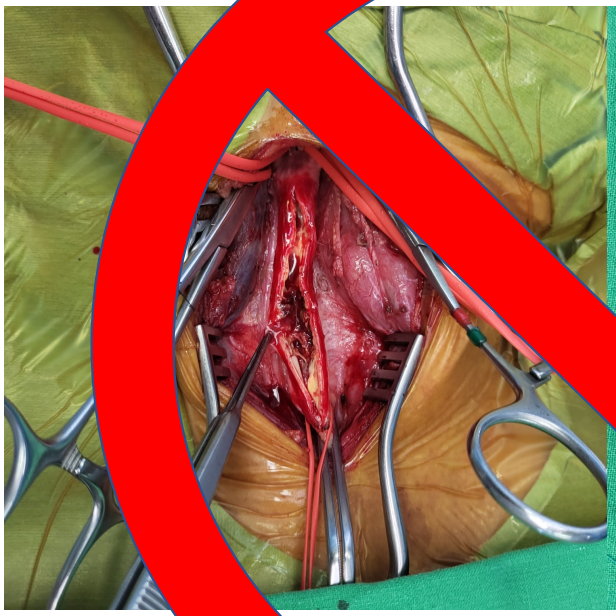
N: 73

Exclude

Bilateral surgery or prior CEA surgery or long intimal lesion

Compare

- 30-day stroke
- CCN injury
- 30-day death



ATCSA2023
Ho Chi Minh city, Vietnam

Results

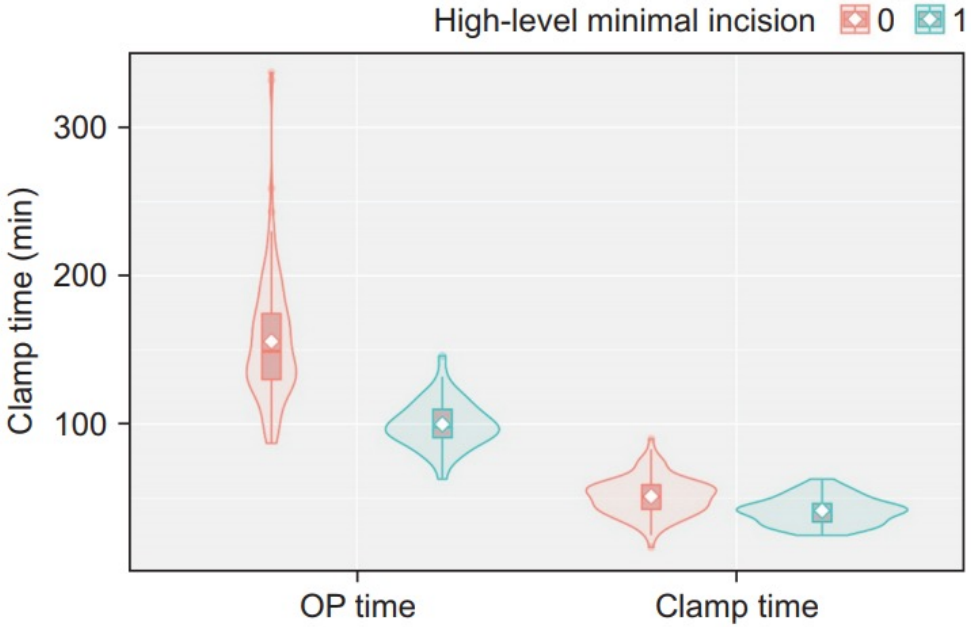
- Patient demographics and clinical characteristics

Incision	Conventional (N=110)	HMI (N=73)	p-value
Age (years)	70.4 ± 7.0	72.1 ± 7.4	0.19
Sex (male)	89 (80.9%)	58 (79.5%)	0.38
BMI (kg/m^2)	23.7 ± 2.6	24.3 ± 2.4	0.20
HTN	80 (72.7%)	60 (82.2%)	0.33
DM	37 (33.6%)	32 (43.8%)	0.09
Hyperlipidemia	76 (69.1%)	42 (57.5%)	0.70
Current smoker	29 (26.4%)	27 (36.9%)	0.58
Lesion severity (severe)	94 (85.5%)	67 (91.8%)	0.16
High level of lesion	25 (22.7%)	16 (22.0%)	0.92

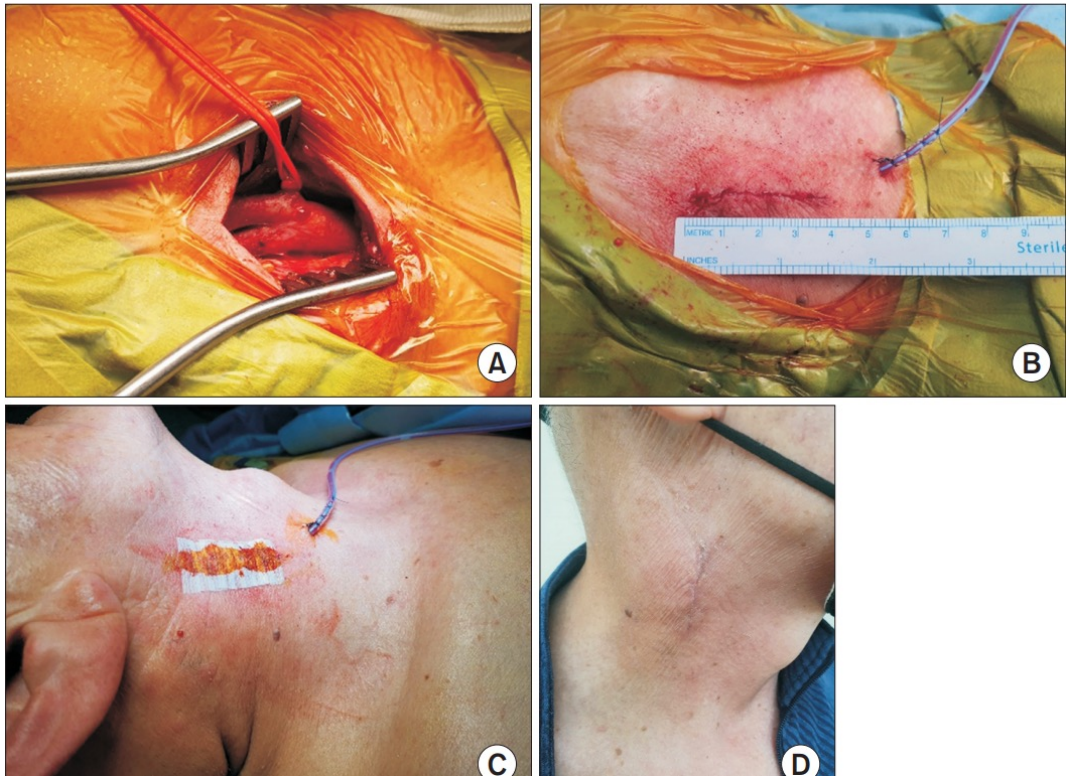
Results

- Operative profiles

Incision	Conventional (N=110)	HMI (N=73)	p-value
Operation time (minutes)	154.5±42.6	100.9±15.9	<0.01*
ICA clamp time (minutes)	50.5±12.7	42.3±9.3	<0.01*
Shunt used	3 (2.7%)	0 (0.0%)	0.56
Post/Pre (rSO2,%)	5.9±7.2	2.7±5.3	0.01*
Post/End (rSO2,%)	1.5±11.6	5.1±10.2	0.09
Incision length (cm)	11.5±2.8	5.3±0.9	<0.01*



Operative wound pictures



Results

- Early postoperative outcomes (<30 days)

Incision	Conventional (N=110)	HMI (N=73)	p-value
30-day stroke	4 (3.6%)	1 (1.3%)	0.58
CCN injury	20 (18.2%)	5 (6.8%)	0.03*
- Hypoglossal nerve	16 (14.5%)	4 (5.5%)	0.08
- Facial nerve and mandibular branches	1 (0.9%)	1 (1.3%)	0.47
- Vagus nerve and its branches	2 (1.8%)	0 (0%)	1.00
- Transverse cervical nerve	1 (0.9%)	0 (0%)	1.00
- Great auricular nerve	0 (0%)	0 (0%)	-
30-day death	0 (0%)	0 (0%)	-

Results

- Univariate and multivariate analysis for cranial and cervical nerve injuries using logistic regression analysis

Variable	Univariate analysis		Multivariate analysis	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age	0.92 (0.86–0.98)	0.01*	0.90 (0.83–0.97)	0.01*
Body mass index	1.09 (0.92–1.28)	0.31		
Sex (female vs. male)	0.41 (0.90–1.87)	0.25		
Severity (severe vs. moderate)	0.66 (0.20–2.20)	0.49		
Asymptomatic	1.67 (0.60–4.71)	0.33		
Hypertension	2.82 (0.79–10.02)	0.11		
Diabetes mellitus	0.74 (0.30–1.84)	0.52		
Hyperlipidemia	4.07 (1.16–14.36)	0.03*	4.54 (0.98–20.94)	0.53
Ulcerative lesion	1.43 (0.59–3.47)	0.43		
Atrial fibrillation	0.48 (0.06–3.96)	0.50		
Contralateral lesion	0.70 (0.26–1.90)	0.49		
High-level of lesion	8.45 (3.31–21.56)	<0.01*	9.56 (3.21–28.42)	<0.01*
Operative method (HMI vs. conventional)	0.63 (0.22–1.80)	0.38	1.42 (0.37–5.42)	0.61
Operation time	1.01 (1.00–1.02)	0.02*	1.01 (1.00–1.02)	0.47
ICA clamp time	1.06 (1.02–1.10)	<0.01*	1.07 (1.03–1.12)	<0.01*
Post/Pre (%)	0.96 (0.90–1.03)	0.26		
Post/End (%)	1.00 (0.96–1.04)	0.86		

Conclusions

- HMI without ultrasonographic guidance is a recommended incision technique for CEA to decrease wound size with positive esthetic results.
- It has the potential to result in fewer neurologic complications by reducing clamp time, a known risk factor.

- Limitations
  1. Bias because the operations were performed by three different surgeons.
  2. A retrospective study and was conducted at a single institution.
  3. Cosmetic evaluations were not conducted in an objective and numerical way.

Thank you for your attention!!