http://dx.doi.org/10.23999/j.dtomp.2017.3-4.2

PAPERS
SCAN

Review of "Transoral Robotic Surgery With Radial Forearm Free Flap Reconstruction: Case Control Analysis" by Biron VL, O'Connell DA, Barber B, Clark JM, Andrews C, Jeffery CC, Côté DW, Harris J, Seikaly H in *Journal of Otolaryngology – Head and Neck Surgery* 2017;46:20

Surgical management of large oropharygneal malignancies has always been a challenging procedure due to the risk of significant morbidity. Traditional approaches to surgical management of these tumors involved a lip-splitting mandibulotomy to completely excise these complex lesions and appropriately reconstruct the defects.

Biron *et al* present an interesting and innovative approach (Fig 1) to managing these malignancies surgically, with a less morbid approach. The use of robotic surgery in oral and maxillofacial, and head and neck surgery, continues to increase. Biron *et al* compared the outcomes of patients with oropharyngeal squamous cell carcinoma, 18 of whom were treated with transoral robotic surgery (TORS) resection and reconstruction with a radial forearm free flap (RFFF), and 39 patients being treated with a lip-splitting mandibulotomy and RFFF reconstruction. Their results demonstrated that addressing these lesions with TORS led to a shorter hospital stay post-operatively (14.4 days vs. 19.7 days), but no significant differences in regards to post-operative complications or morbidity. It is important to note that the RFFF inset was not performed with TORS, but with direct visualization via the neck dissection incision and lateral pharyngotomy approach.

This study describes another treatment modality for oropharygneal malignancies, and demonstrates the primary benefit of decreased hospital length of stay post-operatively. The use of TORS in head and neck surgery also affords us the ability to appropriately treat patients with a less morbid approach.

Section Editor – Robotic Surgery
Salam O. Salman, MD, DDS
Assistant Professor
Jacksonville, FL, USA
salam.salman@jax.ufl.edu

Full Article
Biron et al

Table 1 Matched demographic, exposure and tumor characteristics of patients with oropharyngeal squamous cell carcinoma in this study

Variable	TORS ($n = 18$)	Mandibulotomy ($n = 29$)	*P*
Age, years	59.6	57.6	0.69
Sex, % M	66.7	80.7	0.31
Smoking status (%)	10 (55.5)	17 (58.6)	0.67
P16 positivity (%)	16 (88.9)	25 (93.1)	0.61
Tumor subsite (%)			
Tonsil	13 (72.2)	16 (55.2)	0.36
Base of Tongue	5 (27.8)	13 (44.8)	
Pathologic stage (%)			
T1	5 (27.8)	7 (26.9)	0.96
T2	10 (55.5)	17 (58.6)	
T3	3 (16.7)	5 (19.2)	
N0	1 (5.6)	1 (3.8)	
N1	1 (5.6)	3 (11.5)	0.68
N2	13 (72.2)	23 (79.3.)	
N3	3 (16.7)	2 (7.7)	

which did not occur in TORS patients. There were no free flap failures in either group. No intraoperative or perioperative fatalities occurred.

Cost comparison

Comparison of cost estimates for TORS vs mandibulotomy approaches showed reduced cost of surgical instruments, physician billings and hospital stay associated with TORS (Table 4). Overall, the TORS approach is estimated to result in a cost reduction of $ 6409.98 per case.

Discussion

TORS has been mainly used for the resection of small (T1 or T2) OPSCCs with the resulting defect left to heal

Table 2 Outcomes of oropharyngeal cancer patients treated with TORS vs mandibulotomy and radial forearm free flap reconstruction

Outcome	TORS	Mandibulotomy	*P*
Operative time	15.0	15.5	0.77
LOHS (days)	14.4	19.7	0.03
Positive margins (%)	0	6.9	0.52
ICU stay (days)	1.9	2.0	0.76
Decannulation (days)	7.5	9.1	0.97
G-tube 1 month (%)[a]	16.6	13.7	0.68
G-tube 12 months (%)[b]	5.5	13.7	0.50

ICU intensive care unit; *LOHS* length of hospital stay
[a]G-tube dependency and readmissions to hospital reported for up to 30 days post-discharge
[b]1 year g-tube rates not available for all given the study end date (July 2016) but is available to all patients who did receive a g-tube

Table 3 Adverse events in patients receiving TORS vs mandibulotomy and radial forearm free flap reconstruction

Event	TORS	Mandibulotomy
Hematoma	1	1
Abscess	2	3
Chyle leak	1	1
Blood transfusion[a]	3	5
Airway obstruction[b]	0	3
Pulmonary embolism	0	1
Stroke	0	1
Fistula	0	0
TOTAL	*7*	*15*

No significant differences were seen between groups
[a]Blood transfusions were measured as either intra-operative or post-operatively up to the point of discharge from hospital
[b]Airway obstruction post-tracheostomy decannulation requiring further intervention

secondarily or by primary closure. Recently, a number of reports have described the use of TORS for the resection of larger tumors, traditionally approached by lip-splitting mandibulotomy followed with free flap reconstruction [32–40]. To date, this study reports outcomes on the largest cohort of OPSCC patients treated with TORS and free flap reconstruction and provides the best available evidence for this approach.

TORS with free flap reconstruction is a recent surgical advancement with literature describing this procedure limited to case reports and small case series ranging from one to eleven patients [32–40, 42]. The most common post-TORS free flap reported in the literature is the radial forearm ($N = 37$), followed by anterolateral thigh

Table 4 Cost comparison of TORS vs mandibulotomy and radial forearm free flap reconstruction

Items	TORS	Mandibulotomy
Surgical instruments[a]		
Robotic arms (x2)	$ 1109.72	-
Robotic drapes	$ 469.67	-
Plates and screws	-	$ 1072.58
Saw blades and tubing	-	$ 693.53
Physician billings[b]	$ 181.19	$ 235.25
Surgical ward stay (mean)	$ 16,761.6	$ 22,930.8
Totals	*$ 18, 522.18*	*$ 24,932.16*

Cost shown per case in Canadian dollars. Operating time and intensive care unit stays were not statistically different between both groups and is not shown in the analysis
[a]Only surgical items that are different between both cases are included. Cost of non-disposable items such as the Da Vinci robotic system (purchased prior to the study for non-head and neck robotic surgery) and drills/saws are not included
[b]Includes only billings that are different between both cases, for anesthesia and surgeon codes as per the 2014–2016 Alberta Health Services Schedule of Medical Benefits

FIGURE 1. Cropped screenshot from the article Biron VL, O'Connell DA, Barber B, Clark JM, Andrews C, Jeffery CC, Côté DWJ, Harris J, Seikaly H. Transoral robotic surgery with radial forearm free flap reconstruction: case control analysis. *Journal of Otolaryngology – Head and Neck Surgery* 2017;46:20. http://dx.doi.org/10.1186/s40463-017-0196-0. This is an open access article and distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/).