

Post-operative Complications of Trans-Sphenoidal Surgery in a Local Tertiary Hospital During Hospital Stay

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Abstract

Introduction: Endoscopic trans-sphenoidal surgeries are mainly the procedure of choice in pituitary adenomas with favorable results and varied outcomes arise from these techniques. The study aims to report the postoperative complications, and if these complications may have an impact on hospital stay.

Methods: This is a retrospective cross-sectional study. 47 patients were involved ages 19 years old and above who had trans-sphenoidal surgery (TSS) from January 2011 to December 2016. Data collected were focused on pre-operative diagnosis and post-operative complications (prolonged intubation, post-operative vomiting, CSF leak, post-operative bleeding, adrenal insufficiency, diabetes insipidus, electrolyte imbalance). Chi-square and independent T-tests were used in this study.

Results: Most of the cases reported were nonfunctioning pituitary macroadenoma, prolactinoma and acromegaly. The study showed that the average length of stay of a patient who had undergone TSS is about seven days. Mean age of patients was 47 years old and 59% are males. The five most common complications while at hospital stay were headache (46%), throat irritation (38%), electrolyte imbalance (27%), SIRS (25%), and diabetes insipidus (10%). No sufficient evidence was appreciated with these complications comparing to the length of hospital stay.

Conclusion: Headache is the most common complication of post TSS. Comparing post-operative complications, it did not dictate the length of hospital stay.

Keywords: trans-sphenoidal surgery, complications, hospital stay

Introduction

Outcomes of endoscopic trans-sphenoidal surgery for clinically secretory adenomas are favorable, and results for nonfunctional tumors reveal high rates of complete resection, improvements in vision, and low rates of complications.¹ Local data also suggests that there was improvement in some clinical parameters namely, visual field disturbance both subjectively and objectively and endocrinologic problems reverted back to normal within two weeks post operatively.² However post-operative complications can become factors that can influence the reported hospital stay of trans-sphenoidal surgery (TSS).³ By observing these complications postoperatively and showing possible association with hospital stay, this study may conduct possible guides and anticipate immediate complications that appear while the patient is still admitted in our local clinical setting.

This study aims to determine the common complications occurred post trans-sphenoidal surgery during their hospital stay. More specifically, to determine average length of

hospital stay of TSS patients (Table I); To determine the incidence of post-operative complications of TSS (Table II); to determine the complications observed among patients with hospital stay seven days and above (Table III); to compare clinical complications between patients with hospital stay below seven days and to those with seven days and above. (Table IV)

Methods

This is a retrospective cross-sectional study of patients who underwent TSS at the Makati Medical center from 2011 - 2016. Patients who were eligible for inclusion in the study are all adult patients (18 years old and above) admitted at Makati Medical Center who have undergone TSS. On the other hand, Patients who were excluded in the study are the following: patients who have previous TSS; patients who had removal of sellar-supra sellar mass other than TSS (eg. Craniotomy); patients who underwent radiotherapy for cranial lesions; and pregnant. A total of 47 patients who underwent TSS were included in the study.

Collection of TSS patients was gathered from the yearly records conducted by the neurosurgery department. Review of data was done individually from medical records section via online chart review.

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Table I. Demographic and clinical profile of the patients (n=47)

	Frequency (%); Mean ± SD; Median (Range)
Age (years)	47 ± 15.3
Length of hospital stay (days)	7 (3 to 99)
<7 days	22 (46.81)
≥7 days	25 (53.19)
Height (cm)	162.71 ± 8.85
Weight (kg)	72.11 ± 16.36
BMI	27.14 ± 5.34
Sex	
Male	28 (59.57)
Female	19 (40.43)
Comorbidities*	
Hypertension	20 (42.55)
Diabetes Mellitus	16 (34.04)
Dyslipidemia	14 (29.79)
Thyroid	8 (17.02)
Heart disease	3 (6.38)
COPD	1 (2.13)
Osteoporosis	1 (2.13)
Others	8 (17.02)
Types of thyroid (n=8)	
Hypothyroid	3 (37.5)
MNNTG	3 (37.5)
Hyperthyroid	1 (12.5)
Subclin hyperthyroid	1 (12.5)
Diagnosis	
Pituitary macroadenoma, nonfunctioning	34 (72.34)
Pituitary macroadenoma, prolactinoma	4 (8.51)
Pituitary macroadenoma, GH secreting	3 (6.38)
Others	6 (12.77)

* - Multiple Responses

Table II. Complications among patients who underwent trans-sphenoidal (n=47)

	Frequency (%)
Headache	22 (46.81)
Throat irritation	18 (38.3)
Electrolyte imbalance	13 (27.66)
SIRS	12 (25.53)
Diabetes insipidus	10 (21.28)
Hypertensive Urgency (SBP >160)	6 (12.77)
Post op bleeding	6 (12.77)
Sepsis	5 (10.64)
Post-operative vomiting	4 (8.51)
Costochondritis	3 (6.38)
CSF leak	3 (6.38)
Adrenal insufficiency (Absolute)	2 (4.26)
Adrenal insufficiency (Relative AI)	2 (4.26)
Visual disturbances	2 (4.26)
LGIB/UGIB	2 (4.26)
Decrease sense of smell	1 (2.13)
Fistula Leak	1 (2.13)
Seizure	1 (2.13)

SIRS - Systemic Inflammatory Response Syndrome; LGIB/UGIB – Lower/Upper gastrointestinal bleeding; CSF leak - Cerebrospinal Fluid Leak; Note: Multiple Responses

Clinical and demographic documents, through a standardized data collection sheet, were collected at baseline. This includes: age, sex, date of admission, date of surgery, date of discharge and admission diagnosis. The presence of co-morbidities such as hypertension, chronic

Table III. Complications among patients who underwent trans-sphenoidal surgery with hospital stay seven days and above (n=25)

	Frequency (%)
Headache	15 (60)
Throat irritation	12 (48)
SIRS	9 (26)
Electrolyte imbalance	8 (32)
Diabetes insipidus	8 (32)
Sepsis	5 (20)
Hypertensive Urgency (SBP >160)	5 (20)
Post op bleeding	4 (16)
Post-operative vomiting	4 (16)
CSF leak	2 (8)
Adrenal insufficiency (Absolute)	2 (8)
Adrenal insufficiency (Relative AI)	2 (8)
Visual disturbances	2 (8)
LGIB/UGIB	2 (8)
Fistula Leak	1 (4)
Seizure	1 (4)

SIRS - Systemic Inflammatory Response Syndrome; LGIB/UGIB – Lower/Upper gastrointestinal bleeding; CSF leak - Cerebrospinal Fluid Leak; Note: Multiple Responses

obstructive pulmonary disease, heart failure, chronic kidney disease and diabetes mellitus was also recorded. Post-operative complications (prolonged intubation, post-operative vomiting, CSF leak, post-operative bleeding, adrenal insufficiency, diabetes insipidus, electrolyte imbalance etc.), were collected until the discharge of the patient. Predictors of interest are the post-operative complications, and comparison of these complications with length of hospital stays.

Results

Most cases reported are nonfunctioning pituitary macroadenoma (72%), prolactinoma (8.5%) and acromegaly (6%) while others noted was ACTH secreting micro and macroadenoma, granulomatous hypophysitis, xanthogranuloma, chordoma and tuberculous sellar meningioma. The study showed that the average length of stay of a patient who had undergone TSS) is about seven days. It can be as low as four days to as high as three months depending on the persistence of complications. Mean age of patients was 47 years old and 59% of them were males. The common comorbidities noted in the patients were hypertension (20%), diabetes mellitus type II (16%) and dyslipidemia (14%). The five most common complications while at hospital stay were headache(46%), throat irritation (38%), electrolyte imbalance (27%), SIRS (25%), and diabetes insipidus (10%). There are insufficient evidence to demonstrate a difference from a hospital stay of at least one week to that of more than seven days.

Discussion

The key results noted in the study are the following: First, complications noted are headache, throat irritation,

Table IV. Complications associated with a hospital stay among patients who underwent trans-sphenoidal surgery

	Hospital Stay ≥ 7 days (n=25)	Hospital stay < 7 days (n=22)	P-value
	Frequency (%); Mean ± SD, [n]		
Age (years)	46.04 ± 2.74	48.09 ± 3.66	0.652
BMI	27.04 ± 5.73	27.24 ± 4.99	0.902
Comorbidities*			
Hypertension	11 (44)	9 (40.91)	0.831 ^s
Diabetes Mellitus	9 (36)	7 (31.82)	0.763 ^s
Dyslipidemia	7 (28)	7 (31.82)	0.775 ^s
Thyroid	4 (16)	4 (18.18)	1.000 ^t
Heart disease	1 (4)	2 (9.09)	0.593 ^t
COPD	1 (4)	0	1.000 ^t
Osteoporosis	1 (4)	0	1.000 ^t
Others	5 (20)	3 (13.64)	0.706 ^t
Diagnosis			0.461 ^t
Pituitary macroadenoma, nonfunctioning	17 (68)	17 (77.27)	
Pituitary macroadenoma, prolactinoma	2 (8)	2 (9.09)	
Pituitary macroadenoma, GH secreting	1 (4)	2 (9.09)	
Others	5 (20)	1 (4.55)	
Complications*			
Headache	15 (60)	7 (31.82)	0.053 ^s
Throat irritation	12 (48)	6 (27.27)	0.145 ^s
Electrolyte imbalance	8 (32)	5 (22.73)	0.478 ^s
SIRS	9 (36)	3 (13.64)	0.079 ^s
Diabetes insipidus	8 (32)	2 (9.09)	0.079 ^t
Hypertensive urgency (SBP >160)	5 (20)	1 (4.55)	0.194 ^t
Post op bleeding	4 (16)	2 (9.09)	0.670 ^t
Sepsis	5 (20)	0	0.052 ^t
Post-operative vomiting	4 (16)	0	0.112 ^t
Costochondritis	0	3 (13.64)	0.095 ^t
CSF leak	2 (8)	1 (4.55)	1.000 ^t
Adrenal insufficiency (Absolute)	2 (8)	0	0.491 ^t
Adrenal insufficiency (Relative AI)	2 (8)	0	0.491 ^t
Visual disturbances	2 (8)	0	0.491 ^t
LGIB/UGIB	2 (8)	0	0.491 ^t
Decrease sense of smell	0	1 (4.55)	0.468 ^t
Fistula Leak	1 (4)	0	1.000 ^t
Seizure	1 (4)	0	1.000 ^t

* - Multiple Responses

SIRS - Systemic Inflammatory Response Syndrome; LGIB/UGIB – Lower/Upper gastrointestinal bleeding; CSF leak - Cerebrospinal Fluid Leak

electrolyte imbalance, SIRS, and diabetes insipidus. Second, the average length of hospital stay was seven days and from these data, the researchers divided the group with hospital stays of less than seven days and hospital stays of seven days and above. And Lastly, comparing the complications seen with those of different hospital stays, they have the about the same top five complications (except for in the group of less than seven days of hospital stay two where tied at fourth being SIRS and costochondritis and the fifth being diabetes insipidus) and there is not enough evidence to associate these different complications with the number of days the patient stayed in the hospital post operatively.

By examining and comparing a number of local reports, the investigators noted that: One was done in 2002, in which patients with pituitary tumors were evaluated, from these 22 (out of 45 patients) had undergone TSS, however complications were not included in the study.⁴ Another in 2003, in which 69 (out of 120 patients) underwent TSS, describing an average hospital stay, about 25 days (12 days inpatient before undergoing surgery), and noticing a complication of diabetes insipidus which occurred at 20% and cavernous sinus bleed (1%) postoperatively, however it was not discussed whether these complications occurred on procedure of TSS, or otherwise.⁵ The latest was done in 2009, 29 (out of 41 patients) of which underwent TSS, the common complications encountered were transient diabetes insipidus (17%), CSF leak (9%), hemorrhage (4%), transient worsening of vision (4%) and death (2%).⁶

Previous studies were also appreciated. One in 1994, in which 12 TSS were done and had only one complication which was subdural hematoma² and another in 1984 which there where eight designated cases of TSS, one mortality and one visual disturbance.⁷

Internationally, many different post-op complications were described, others focused on the major complications only such as diabetes insipidus, CSF leak, post-op bleeding and meningitis,^{8,9,10} while few added in their study the complications which varies depending on insurance status.¹¹ The research was constructed in accord with that done in 2015¹², in which their post-op complications were CSF leak (40%), diabetes insipidus (14%), prolonged ventilation (14%), bleeding/hematoma (10%) and post-op nausea and vomiting (6.7%). Although this study, prolonged ventilation and bleeding/hematoma might be more common because the research was conducted from an anesthesiologist point of view.

Comparing native reports from the one that has been conducted, this maybe one of the first locally done research which provides postoperative complications specific to that of Trans-sphenoidal Surgery only. Also, there was notable decrease in number of major complications, although it is inconclusive and no direct comparative analysis was done, the investigators are compelling that it may be due to improved clinical surveillance through out years of practice along with experience of the surgeon in conducting the procedure.

Implicating it in our practice setting, supportive care and active observation still dictates us to look for these problems how minor or rare. From this observation, diabetes insipidus is still one of the most common complications encountered, although much less common now compared previous investigations, and along with electrolyte imbalance specifically the serum sodium, it may help us in early diagnosis and management of DI.

Conclusion

Headache was noted to be the most common postoperative complication, others were throat irritations, electrolyte imbalance, diabetes insipidus and SIRS and when comparing these complications, we have insufficient evidence to demonstrate a difference from a hospital stay.

It is recommended to conduct similar future researches comparing it with different institution to help improved quality of management in a patient. Since Diabetes insipidus and electrolyte imbalance is still one of the most common complications of post TSS we can create a hospital practice guideline to mandate regular electrolyte checking (even if clinically stable) and strict recording of accurate urine input and output (routine without ordering from the chart).

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