

A Nationwide Inpatient Database Assessment of Pituitary Tumor Resection Complications

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INTRODUCTION

The Nationwide Inpatient Sample (NIS) contains all-payer data on hospital inpatient stays from states participating in the Healthcare Cost and Utilization Project (HCUP). All discharges from sampled hospitals are included in the NIS database (5). This study aims to explore a range and incidence of perioperative complications associated with pituitary tumor resection.

MATERIALS AND METHODS

This is a retrospective study. The NIS is the largest all-payer inpatient care database in the United States and represents approximately 20% of all inpatient admissions (5). Hospitalizations for pituitary resections were identified by cross-matching International Classification of Diseases-9 (ICD-9) codes for diagnoses of pituitary tumor and perioperative complications of interest for pituitary tumor resection. The database was selected for patients with pituitary tumor diagnoses ICD-9-CM 194.3, 198.89, 234.8, 227.3, 237.0. Patients less than 18 years old were removed from the study. Of these diagnoses, pituitary tumor resections were selected with codes ICD-9-CM 07.61-07.65, 07.68, 07.69, 07.71. 6019 cases of pituitary tumor resections were analyzed for anesthetic [utilizing ICD-9-CM codes 995.89, 995.86, 995.4, E876.3, E938.1, E938.2, E938.4, E938.7, 968.1-968.4, 968.7], operative [285.1, 998.1, 998.11, 998.12, 998.13, E870.0, 998.3, 998.7], perioperative cardiovascular [utilizing ICD-9-CM codes 997.1, 410, 785.50, 785.51, 785.59, 998.0, 453.4, 453.8, 453.9, 415.1, 415.11, 415.19] and perioperative pulmonary complications [utilizing ICD-9-CM codes 997.3, 518.81, 518.4, 518.5, 512.1, 31.1, 31.2, 31.29, 96.7]. Analysis was carried out in SAS.

RESULTS

Analysis of data identified a total of 73,596 diagnoses of pituitary tumor, and 6,019 of the diagnoses underwent pituitary resections. 493 resections were complicated [see Table]. Acute post hemorrhagic anemia (1.45%, ICD-9-CM 285.1) was a most common operative complication, followed by hemorrhage complicating procedure (1.05%, ICD-9-CM 998.11) and by hematoma complicating procedure (0.56%, ICD-9-CM 998.12). Of the 6,019 resections, cardiac arrest and cardiorespiratory failure resulting from the procedure (0.83%), iatrogenic pulmonary embolism and infarction (0.15%) and other pulmonary embolism (0.32%) were the most common cardiovascular complications. Less frequent cardiovascular complications included peripheral vascular complications including phlebitis, thrombophlebitis (0.05%) and cardiogenic shock (0.03%). Of the 493 complicated resections cardiac arrest/cardiorepiratory failure during or resulting from a procedure (10.14%), iatrogenic pulmonary embolism and infarction (1.83%), venous air embolism or thrombosis of other

Frequency of Perioperative Complications by ICD-9-CM in Pituitary Tumor Resection.				
Total Resections	6,019			
Complicated Resections	493			
ICD-9-CM	Complication	Number	Percent of Resections (%)	Percent of Complicated Resections (%)
Anesthetic Complications				
995.89	Hypothermia following anesthesia	0	0.00%	0.00%
995.86	Malignant hyperthermia	0	0.00%	0.00%
995.4	Shock due to anesthesia	0	0.00%	0.00%
E876.3	Endotracheal tube wrongly placed during anesthetic	0	0.00%	0.00%
E938.1	Halothane causing adverse effects	0	0.00%	0.00%
E938.2	Other gaseous anesthetics causing adverse effects	0	0.00%	0.00%
E938.4	Other/ unspecified general anesthetics cause adverse effects	0	0.00%	0.00%
E938.7	Spinal Anesthetic adverse effect	0	0.00%	0.00%
968.1	Poisoning by halothane	0	0.00%	0.00%
968.2-4	Poisoning by other gas or IV anesthetic	0	0.00%	0.00%
968.7	Poisoning by spinal anesthetic	0	0.00%	0.00%
Operative Complications				
285.1	Acute post-hemorrhagic anemia	87	1.45%	17.65%
998.1	Hemorrhage or hematoma complicating a procedure, NOS	0	0.00%	0.00%
998.11	Hemorrhage complicating a procedure	63	1.05%	12.78%
998.12	Hematoma complicating a procedure	34	0.56%	6.90%
998.13	Seroma complicating a procedure	1	0.02%	0.20%
E870.0	Accidental perforation or hemorrhage during operation	0	0.00%	0.00%
998.3	Disruption of operation wound	0	0.00%	0.00%
998.7	Acute reaction to foreign substance left during a procedure	0	0.00%	0.00%
Cardiovascular Complications				
997.1	Cardiac arrest/insufficiency, cardiorespiratory failure during or resulting from a procedure	50	0.83%	10.14%
410	Acute myocardial infarction	0	0.00%	0.00%
785.50	Unspecified shock	0	0.00%	0.00%
785.51	Cardiogenic shock	2	0.03%	0.41%
785.59	Hypovolemic shock	0	0.00%	0.00%
998.0	Postoperative shock	6	0.10%	1.22%
453.4	Venous embolism and thrombosis of deep vessels of lower extremity	0	0.00%	0.00%
453.8	Venous embolism or thrombosis of other specified veins	6	0.10%	1.22%
453.9	Embolism or thrombosis of unspecified site	0	0.00%	0.00%
415.1	Pulmonary embolism and infarction	0	0.00%	0.00%
415.11	Iatrogenic pulmonary embolism and infarction	9	0.15%	1.83%
415.19	Other pulmonary embolism	19	0.32%	3.85%
997.2	Peripheral vascular complications (including phlebitis and thrombophlebitis)	3	0.05%	0.61%
Pulmonary Complications				
997.3	Respiratory complications	8	0.13%	1.62%
518.81	Acute respiratory failure	63	1.05%	12.78%
518.4	Acute edema of lung, unspecified	4	0.07%	0.81%
518.5	Pulmonary insufficiency	82	1.36%	16.63%
512.1	Iatrogenic pneumothorax	1	0.02%	0.20%
31.1 (procedure)	Temporary tracheostomy	55	0.91%	11.16%
31.2 (procedure)	Permanent tracheostomy	0	0.00%	0.00%
31.29 (procedure)	Other permanent tracheostomy	0	0.00%	0.00%
96.7 (procedure)	Other continuous invasive mechanical ventilation	0	0.00%	0.00%

specified veins and other pulmonary embolism(3.85%) were the most frequent perioperative cardiovascular complications. Less frequent complications included postoperative shock (1.22%), peripheral vascular complications including phlebitis and thrombophlebitis (0.61%) and cardiogenic shock (0.41%).Pulmonary insufficiency following trauma and surgery (1.36%, ICD-9-CM 518.5), acute respiratory failure (1.05%, ICD-9-CM 518.81), temporary tracheostomy (0.91%, ICD-9-CM 31.1) and respiratory complications not elsewhere classified (0.13%, ICD-9-CM 997.3) were the most common pulmonary complications. Less frequent complications included acute lung edema (0.07%, ICD-9-CM 518.4) and iatrogenic pneumothorax (0.02%, ICD-9-CM 512.1). Of the 493resections with one or more complications, pulmonary insufficiency following trauma and surgery (16.63%) and acute respiratory failure (12.78%) were the most frequent perioperative pulmonary complications.

DISCUSSION

Perioperative management in pituitary tumor resection cases can be complicated (2). Assessed data demonstrates an incidence of different operative and anesthetic complications during pituitary tumor resections and may help to create future guidelines and setup management priorities. HCUP NIS data revealed intraoperative hemorrhage and hematoma as a most common operative complication during pituitary tumor resection, cardiorespiratory failure during or resulting from a procedure as a most common perioperative cardiovascular complication and pulmonary insufficiency as the most common perioperative pulmonary complication. The anesthesia care of patients undergoing pituitary surgery involves an understanding of the varied complications and their implications for the patient's management. The neuroanesthesiologist must have an appreciation of the issues relevant to the surgical and postoperative complications and be able to anticipate and manage them accordingly (3). Anesthetic and surgical complications must all be analyzed as possible causes of postoperative complications, and these factors must be kept in the forefront of the anesthesiologists mind during the perioperative periods (4, 5).

CONCLUSION

The analyzed data demonstrates an incidence of different perioperative complications during pituitary tumor resections and can help to create future guidelines and establish management priorities.

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