

Trends in Pediatric Mastoiditis and Its Complications: A Retrospective Review



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Introduction

Mastoiditis is a serious and potentially devastating complication of acute otitis media that may lead to further intracranial complications if left untreated, most found in the pediatric population. Treatment consists of intravenous (IV) antibiotics, and surgical intervention in certain cases. The purpose of this study is to analyze trends in patient demographics, trends, management, and costs of pediatric mastoiditis to identify areas for improvement in the management of this condition.

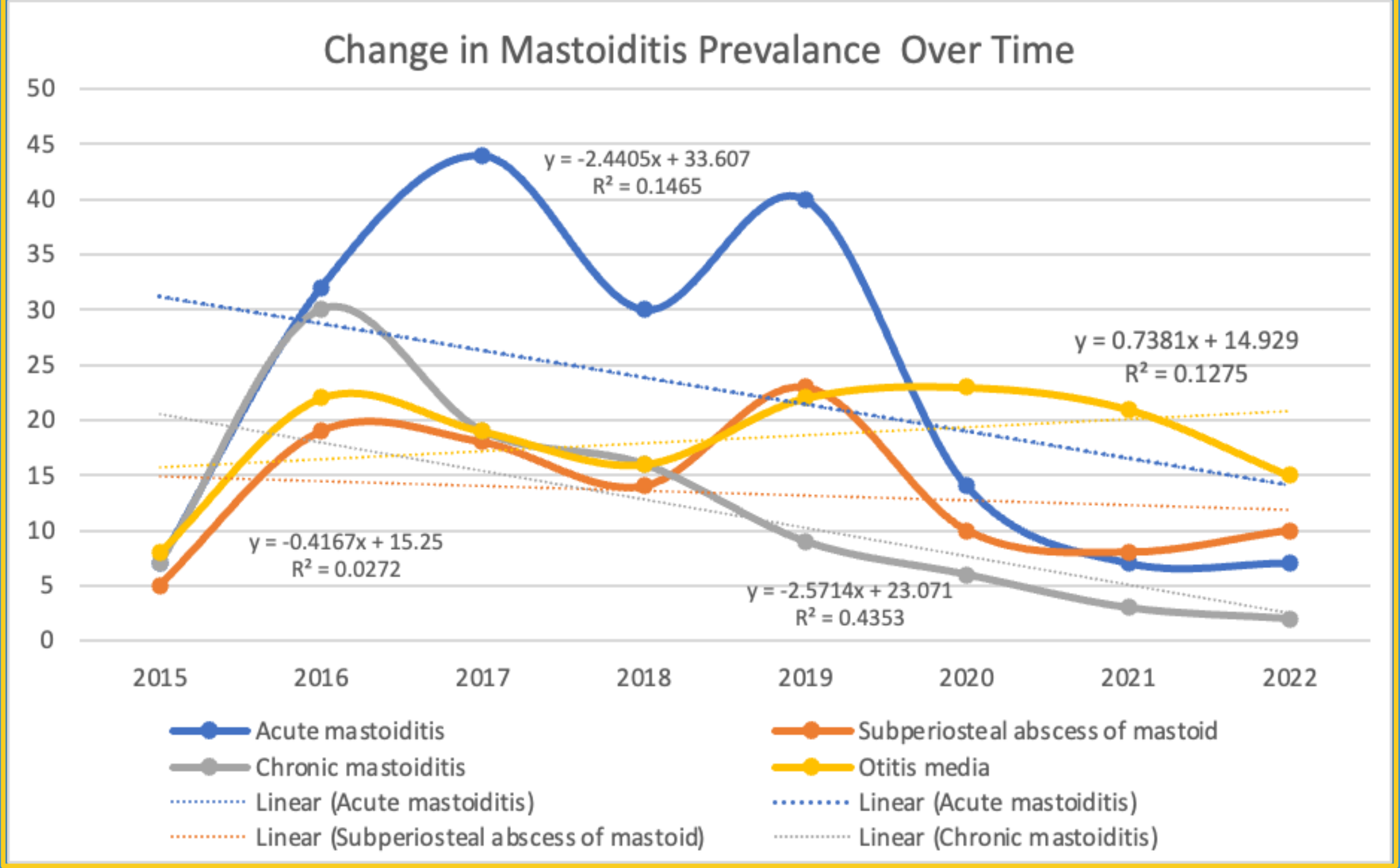
Methods

The 2016-2022 Pediatric Health Information System (PHIS) database was queried for pediatric patients diagnosed with mastoiditis including otitis media, acute mastoiditis, subperiosteal abscess of mastoid, and chronic mastoiditis. Patient demographics, length of stay, duration of inpatient IV antibiotic treatment, billed charges and estimated costs were analyzed.

Patient Demographics

Factor	Acute mastoiditis	Subperiosteal abscess of mastoid	Chronic mastoiditis	Otitis media	p-value
N	181	107	92	146	
Age in years, mean (SD)	6.81 (4.78)	5.21 (4.61)	10.23 (4.51)	8.75 (3.90)	<0.01
Age in years, median (IQR)	6.05 (2.39, 10.35)	4.31 (1.08, 8.85)	10.51 (5.85, 13.69)	8.15 (5.62, 11.44)	<0.01
Gender					<0.01
Male	100 (55.2%)	61 (57.0%)	71 (77.2%)	75 (51.4%)	
Female	81 (44.8%)	46 (43.0%)	21 (22.8%)	71 (48.6%)	
Child Race					0.34
Non-Hispanic White	132 (73.7%)	77 (74.8%)	54 (62.8%)	107 (75.9%)	
Non-Hispanic Black	14 (7.8%)	9 (8.7%)	14 (16.3%)	16 (11.3%)	
Asian	7 (3.9%)	4 (3.9%)	2 (2.3%)	2 (1.4%)	
Other	26 (14.5%)	13 (12.6%)	16 (18.6%)	16 (11.3%)	
Payment					0.007
Government	114 (63.0%)	65 (60.7%)	53 (57.6%)	66 (45.2%)	
Private	55 (30.4%)	36 (33.6%)	38 (41.3%)	73 (50.0%)	
Self	12 (6.6%)	6 (5.6%)	1 (1.1%)	7 (4.8%)	
Adjusted Billed Charges, mean (SD)	87263.29 (69314.59)	91920.34 (83670.17)	49391.05 (35194.25)	14267.91 (18304.43)	<0.01
Adjusted Billed Charges, median (IQR)	63383.05 (44855.82, 95330.31)	68956.98 (46869.59, 117618.98)	40564.25 (25796.21, 60446.59)	7439.04 (3920.68, 15437.99)	<0.01
Estimated Cost, mean (SD)	29025.05 (26451.07)	31325.83 (31621.48)	15218.96 (11794.10)	5586.53 (7151.51)	<0.01
Estimated Cost, median (IQR)	20621.00 (12619.00, 30961.00)	25525.00 (15852.00, 40297.00)	11549.00 (7463.50, 17535.50)	2943.50 (1808.00, 5682.00)	<0.01

Mastoiditis Over Time



Conclusions

There were notable, clinically, and statistically significant differences in age at presentation, gender, cost of hospital stay, and days of IV antibiotic usage among US children diagnosed with severe acute otitis media, mastoiditis, and its complications. Opportunities to reduce cost and length of stay can be explored based on the above trends.

Results

A total of 838 patients (42.00% female) less than 18 years of age were diagnosed with either acute mastoiditis, subperiosteal abscess of the mastoid, chronic mastoiditis, otitis media, or petrositis. There was a significant difference in mean age at presentation, with subperiosteal abscess being the youngest, and chronic mastoiditis the oldest (4.85±4.41 vs 10.16±4.48 years, p<0.001). Males made up a greater proportion of diagnosed cases of all pathologies queried, except petrositis. There was no racial difference among diagnoses (p=0.39). There was a significant difference in mean estimated cost, with petrositis being the highest and otitis media the lowest (US \$43,088.75± 26735.83 vs \$5,521.96±7391.95, p<0.001). Otitis media also had the lowest mean length of stay in days, whereas acute mastoiditis had the highest (1.23±1.25 vs 6.30±5.93, p<0.001). Similarly, acute mastoiditis has the highest mean days of IV antibiotic while otitis media had the lowest number (5.84±5.88 vs 0.19± 1.08, p<0.001).



Acknowledgments

Data for this study were obtained from the Pediatric Health Information System (PHIS), an administrative database that contains inpatient, emergency department, ambulatory surgery and observation encounter-level data from not-for-profit, tertiary care pediatric hospitals in the United States. These hospitals are affiliated with the Children's Hospital Association (Lenexa, KS). Data quality and reliability are assured through a joint effort between the Children's Hospital Association and participating hospitals. For the purposes of external benchmarking, participating hospitals provide discharge/encounter data including demographics, diagnoses, and procedures. Nearly all of these hospitals also submit resource utilization data (e.g. pharmaceuticals, imaging, and laboratory) into PHIS. Data are de-identified at the time of data submission, and data are subjected to a number of reliability and validity checks before being included in the database.