

Diagnosis, Management, Treatment Outcomes, and Cost of Treating Acute Cervical Lymphadenitis in Children

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Introduction

- Acute cervical lymphadenitis is commonly seen in pediatric emergency departments (1). The evaluation and treatment varies based on symptom severity, clinical impression, and results of laboratory and imaging studies.
- Additional factors that lead to variations in management include:
 - Ultrasound (US) vs. CT imaging, if obtained, and whether report indicate presence of "abscess"
 - Description by radiologist often influences decision for admission and/or surgical intervention
 - If infectious disease and/or otolaryngology are consulted by hospitalists upon admission or during course of hospitalization
 - Decision for surgical intervention by otolaryngologists once consulted.
- Most common organisms identified by cultures are *Staphylococcus aureus* followed by *streptococcus pyogenes* (2, 3). The antibiotic resistance possessed by these organisms has shifted within the past decade, which has complicated treatment (4).
- Length of hospital stay varies among patients based on physician evaluation of the patient, decision making, and clinical course. In reviewing our experience, we look for opportunities to identify means of consistently decreasing length of stay (LOS) as well as decreasing associated hospital charges and health care expenditure.

Methods

- A retrospective summary was performed including all patients 18 years or younger with diagnosis of acute cervical lymphadenitis. All were admitted to our tertiary-care children's hospital between October 2013 and December 2014. Patients were excluded from analysis if there was underlying immunodeficiency or if they were on immunocompromising treatment. This study was approved by the Nemours Children's Hospital Institutional Review Board as well as the UCF College of Medicine Institutional Review Board.
- De-identified data were abstracted from electronic medical records using a standardized data collection form. Data collected include patient demographics, clinical presentation, laboratory test results, imaging study results, if surgical incision and drainage was performed, culture and susceptibility results, antibiotics used, length of stay, and hospital charges. All patient data was entered into a password-protected database. Statistical analysis was performed with SPSS. Demographics and categorical variables were expressed as frequencies and percents, and quantitative variables by median and distribution statistics.

Results

- A total of seventy patients were reviewed: 39 males, median age 5.5 years (6mo – 17 yrs), with 38 patients (54.3%) admitted. Diagnostic ultrasound was performed in 42.9% of patients, while 27.1% underwent CT scan (CT). (Table 1)
- Compared to patients with acute cervical lymphadenitis who were not admitted, the admitted patients had higher white blood cell counts (WBCs) and higher erythrocyte sedimentation rates (ESR). (admitted WBCs: median=15.2, range=5.8 to 36.4, non-admitted WBCs: median=7.6, range=3.8 to 15.8; p<0.001), (admitted ESRs: median=45, range=5 to 121, non-admitted ESRs: median=8.5, range=3 to 34; p=0.05). (Table 2)

Results Cont.

- Those who were admitted were more likely to have undergone imaging evaluation, US (p=0.001), and similarly for CT (p<0.001).
- Patients who were admitted were more likely to have radiology report stating "abscess" or "phlegmon" (p=.023).
- On US, "phlegmon" was a more commonly identified than "abscess", (51.6%, vs. 22.6%). However on CT, "abscess" was reported more often than "phlegmon" (57.9%, vs. 26.3% (p=.014) (Table 3)
- A report of "phlegmon" led to a longer LOS vs. report of "abscess" (1.8 days for "phlegmon" vs. 1.0 days for "abscess") (p=.003)(table 4)
- For the admission group, half of the patients received otolaryngology consultation and LOS was shorter for this group vs. patients who did not receive ENT consultation (p<.001) (Table 5)
- Overall, 25% underwent surgical incision and drainage (I&D).
- Those who underwent I&D were more likely to have CT scan (p=0.028) and "abscess" on CT (p=0.02).
- Methicillin-Sensitive Staph aureus* was most common organism identified (44.4%, half of isolates were clindamycin-resistant) followed by *Methicillin-Resistant Staph aureus* (33.3%, all were clindamycin-sensitive). (table 6)
- The median length of stay for treatment of patients with acute cervical lymphadenitis was found to be 1.5 days (range: 1 - 13 days).
- Median charge of hospitalization for patients admitted with acute cervical lymphadenitis was \$15,154.50 (\$4,670.00–\$135,286.03).
- Of those treated exclusively by IV antibiotics, 9.6% of patients required readmission. No patients from I&D group required readmission. (Table 7)

Table 1
Patient Characteristics.

	n	%
Admitted	38	54.3
Male	39	55.7
Median age (yrs.)	5.5	
Imaging		
Ultrasound	31	42.9
CT scan	19	27.1
ENT consultation obtained	35	50
Type of Management		
Surgical	18	25.7
Medical	52	74.3

Table 2
Laboratory test comparison between the two treatment groups.

	median (range)
WBC count (mg/dL)	
Admitted	15.2 (5.8 - 36.4)
Non-admitted	7.6 (3.8 - 15.8)
ESR (mg/dL)	
Admitted	45 (5 - 121)
Non-admitted	8.5 (3 - 34)

Table 3
Imaging report data.

	n	%
Ultrasound	31	
Phlegmon	16	51.6
Abscess	7	22.6
CT Scan	19	
Phlegmon	5	26.3
Abscess	11	57.9

Results Cont.

Table 4

Length of stay based on wording of imaging reports

	n	LOS (days)
Phlegmon	21	1.8
Abscess	18	1.0

Table 5

Length of stay based on Otolaryngology Consultation

	LOS (days)
Patients who received ENT consultation	1.0
Patients who did not	1.6

Table 6

Culture/susceptibility data and isolated organisms.

	n	%
Aerobic culture	68	96.7
Positive	32	47.4
Negative	36	52.6
Anaerobic culture	43	61
Positive	4	5.6
Negative	39	94.4
AFB culture	23	32
Positive	4**	5.6
MRSA	24	33.3
Clindamycin sensitivity	24	100
MSSA	32	44.4
Clindamycin sensitivity	16	50

**= M Avium Complex

Table 7

Readmission rates.

	n	%
Patients treated medically	52	74.3
Readmissions	7	9.6
Patients treated with I&D	18	25.7
Readmissions	0	0

Discussion

- Significant variation in the diagnosis and management of acute cervical lymphadenitis persists to date.
- Identification of a drainable fluid collection on CT or US predicts admission for acute cervical lymphadenitis, and image report of "phlegmon" leads to a longer LOS than does a report of "abscess."
- High WBC count and high ESR predict admission for patients diagnosed with acute cervical lymphadenitis.
- Our study found the most common causative organism to be *MSSA* (50% clindamycin resistant). *MRSA* (2nd most common causative agent) was 100% clindamycin sensitive. MAC found in few cases.
- Single agent clindamycin is the most common medical treatment utilized, followed by clindamycin-ceftriaxone dual therapy.
- Conservative treatment can lead to a higher readmission rate than surgical treatment.
- Patients who receive ENT consultation have a decreased LOS compared with those who do not.
- Early ENT consultation and identification of appropriate patients for early I&D and culture help to minimize LOS and decrease readmission rates.

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