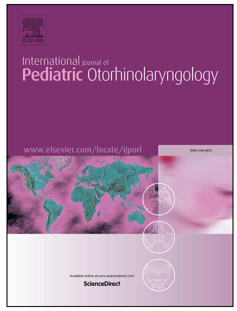
Accepted Manuscript



Acute pediatric neck infections: Outcomes in a seven-year series

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PII: S0165-5876(17)30239-2

DOI: 10.1016/j.ijporl.2017.05.020

Reference: PEDOT 8554

To appear in: *International Journal of Pediatric Otorhinolaryngology*

Received Date: 13 February 2017

Revised Date: 18 April 2017

Accepted Date: 25 May 2017

ACUTE PEDIATRIC NECK INFECTIONS: OUTCOMES IN A SEVEN-YEAR SERIES

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INTRODUCTION

Acute neck infections (ANIs) can occur at any age and are not uncommon in children [1]. However, its incidence seems to be diminishing due to the development of antibiotics and improvement of health care in general [2]. These infections are known to spread along fascial planes and potential spaces of the neck. Infection in one space can easily spread to another space as well as to connecting regions, such as the mediastinum and along the vertebral spine [3]. Because of this complex anatomy of the head and neck and the subtle symptoms of the children, a high index of suspicion is necessary to prevent failures in diagnosis [4]. In paediatric ages the initial symptoms can range from upper respiratory tract symptoms, with or without fever, to decreased oral intake, neck pain, swelling of the cervical lymph nodes, and limitations in neck range of motion with or without *trismus* [5]. Because of their rapidly progressive nature, an assertive management is required to avoid delays in diagnosis and treatment that may lead to serious potential complications, including airway obstruction, jugular vein thrombosis, mediastinitis and sepsis [6]. Appropriate antibiotic therapy, surgical drainage and management of complications are the mainstays of treatment for ANIs [3]. Some authors defend that an initial medical treatment with empiric intravenous antibiotic therapy should be tried, reserving surgery for those cases that fail to clinically improve or to secure a compromised airway [5,7]. Furthermore, the presence of airway obstruction and multiple abscess sites have been reported in association with severe infections and complicated clinical courses, which may lead to an undesired outcome [8].

The purpose of this study was to analyse the epidemiology, clinical presentation, diagnostic clues and age of children with ANI to identify possible independent prognostic factors leading to complications and prolonged hospitalization.

MATERIAL AND METHODS

A retrospective study was performed with paediatric patients (<18 years) admitted in the emergency department and hospitalized in the Otorhinolaryngology (ENT) department in Centro Hospitalar de São João (Porto, Portugal), with diagnostic codes of ANIs from January 2008 to December 2014. Superficial infections, phlegmon/cellulitis, thyroid gland infections, infections due to external cervical injury (traumatic or surgical), infections of the head and neck associated with neoplastic pathology, and clinical cases with insufficient information were excluded from this study.

Clinical variables were reviewed and grouped into: a) Demographic: age, sex and season; b) Current episode: aetiology and site of infection, clinical presentation, prior medical observation/use of antibiotics (ATB), number of days with symptoms until presentation, length of hospitalization, complications and recurrence; c) Diagnostic procedures: clinical, laboratory data and imaging studies; d) Treatment: medical or surgical. A recurrent disease was defined as the reappearance of infection one month after clinical remission.

ANIs were categorized according to the site of infection in peritonsillar, parapharygeal, retropharyngeal, submandibular, mixed type and “other abscesses”, according to the classification of Levitt [9]. The determination of the affected areas by cervical infection was established by clinical assessment, imaging [ultrasound (US); computed tomography (CT); magnetic resonance imaging (MRI)] of the neck and chest, and intraoperative findings.

The reference values of our laboratory analysis were used for white blood cells count (WBC) (4.0-11.0 cells/mL) and C reactive protein (CRP) (<3.0 mg/L).

The patients were categorized into two groups that were compared: children (aged<10 years) or adolescents (aged 10-18 years). Comparison of the data from patients with different ANIs was performed.

Data were entered into a database, and statistical analyses were performed using the Statistical Package for the Social Sciences® (version 23.0, SPSS®). Comparisons between groups were made using Student´s *t* test and Mann-Whitney U test for continuous variables and Chi-square test or Fisher´s exact test for categorical variables. A multiple linear regression model was performed in order to predict prolonged hospitalization. Additionally, a binary logistic regression was performed in order to predict ANIs complications. A *p* value<0.05 was considered statistically significant.

The Health Ethics Committee of Centro Hospitalar de São João EPE approved the study design and methodology.

RESULTS

A total of 159 hospitalized patients were enrolled, with 102 patients belonging to the children´s group (mean age±standard deviation (SD), 4.4±2.6 years) and 57 to the adolescents group (mean age±SD, 13.8±2.7 years). Males predominated in the children´s group (53:49), but not in the adolescents group (27:30) (*p*=0.579). Fifty-seven patients (32.2%) had a prior medical consultation before admission to the hospital, and 49 of them (27.2%) were already on antibiotics, mostly amoxicillin/clavulanic acid (*n*=25), penicillin (*n*=13) or amoxicillin alone (*n*=3). In 61 cases (37.4%), the patients were referred from other hospitals to the tertiary emergency department of our hospital .

Throughout the study period the number±SD of episodes per year was 22.7±5.3, with a peak prevalence in 2012 (Figure 1). The distribution of patients with ANI showed little seasonal variation: 23.3% during fall, 22.2% in winter, 20.6% in spring and 22.2% in summer.

Peritonsillar abscesses were by far the most prevalent in both age groups (Figure 2). The location of ANIs varied among the different groups and an association between age and type of abscess was found, with most of the retropharyngeal abscesses occurring in young children (*P*=0.05), and the submandibular abscesses in adolescents (*p*<0.001) (Figure 2, Table 1). Four peritonsillar abscesses progressed to parapharyngeal (n=2) and retropharyngeal abscesses (n=2).

A predisposing cause of the ANI was determined in 132 patients (83%) and, in most cases, the aetiology corresponded to oropharyngeal infections (57.9%). The primary focus of infection could not be determined in 27 patients (17%) and it was not possible to correlate infections of the adenoids with ANIs (Figure 3).

The median duration of symptoms before presentation was 4 days (1-21 days). The most frequent symptoms and signs on admission were fever (63.9%), odynophagia (50.6%), pharyngeal bulging (46.1%), and neck mass (35%). No one had airway symptoms like dyspnea and stridor (Table 2).

One hundred and forty-five patients (80.6%) completed cell blood count (CBC) and a biochemical study showing an increase in bacterial infectious parameters (WBC count and CRP) in most patients. The mean±SD WBC count and CRP at the time of presentation were 17,964±7,177 cells/mL (range 6,490 cells/mL - 48,400 cells/mL) and 111,847±82,149mg/L (range 3,500mg/L- 350,600mg/L).

Imaging was performed in 140 patients (88%) in order to identify the location, extent and characteristics (cellulitis or abscess) of the infection, as well as to plan the surgical intervention when necessary. A neck ultrasound was taken in 17 cases (9,4%), in seven of them as the sole imaging procedure whereas, in the remaining 10 patients, a complementary imaging test was done for better characterization of the abscess (9 did a CT and one did CT and MRI). So, a CT was requested in 133 patients (83.6%) but two (1.3%) of them also performed a subsequent MRI. Abscess dimensions on imaging varied much between patients, ranging between 8 mm and 70 mm across the widest axis (mean±SD of 26.1±12.1mm). Ninety patients (67,7%), who did a CT, had an abscess size ≥ 20 mm and 37 patients (27,8%) had an abscess size <20mm. The remaining 6 patients (4.5%) performed a CT in another hospital and the information could not be retrieved. Radiologic diagnosis was in agreement with the operative findings in 87 (63%) patients (accuracy). There were 24 (17.4%) false-positive studies in which CT diagnosed abscess but no pus was identified at surgery. Positive predictive value was 65.4%. In our study, patients with an image compatible with cellulitis were excluded, so it was not possible to determine the sensitivity, specificity, false negative and negative predictive value of the exam.

On admission, all patients were immediately treated empirically with broad-spectrum intravenous (iv) antibiotics (ATB), in order to cover the majority of aerobic, gram-negative and gram-positive organisms involved in ANIs, and taking into consideration the high incidence of polymicrobial infections. The first-line treatment was changed in accordance with the microbiological results of the pus, as appropriate. The most commonly used treatment regimens were clindamycin with ceftriaxone (46.7%), ceftriaxone alone (14.4%) and clindamycin with gentamicin (13.3%). Complementary symptomatic treatment was also initiated, which included antipyretics, analgesics, corticosteroids and fluid therapy. Twenty-one patients (13%) were successfully managed with exclusive medical treatment; the majority belonged to the children´s group (18, p=0.027) and had an abscess size <20mm (p<0.001).

The remaining 138 patients (86.8%) required drainage of the abscess (Table 3). Those cases with an abscess size ≥20mm on CT underwent surgery more often (*p*=0.001) and showed a purulent collection at surgery (*p*=0.010).

Patients who underwent surgery had a greater number of days of hospitalization compared to those who did only medical treatment (*p*=0.012). Those that did not improve with antibiotics and needed surgery 24-48 hours after admission, 10 (90,9%) were from the children´s group (*p*=0.05) and the majority had an abscess size ≥20mm (*p*=0.950). However, no differences in the average length of stay were observed between surgical patients operated on immediately or in a delayed fashion (*p*=0.131).

Microbiologic specimens were harvested from 87 patients (54.7%) during surgical drainage. Forty showed positive culture (45.9%), from which five were polymicrobial. The most commonly isolated pathogen was *Streptococcus pyogenes* (Table 4).

Four cases (2.5%) needed to stay at the intensive care unit (ICU), due to airway obstruction complicating the clinical picture: two submandibular, one peritonsillar and one parapharyngeal abscesses (Table 5). These children stayed in the ICU for 4±2 (mean±SD) days, for assisted ventilation and to monitor obstructive airway events. The frequency was the same in both groups. There was no statistically significant association between those ICU patients who received antibiotics only and those who also underwent surgery in relation to complications. The four cases with airway obstruction were drained in the first 24 hours and none required a second intervention. No long-lasting sequelae or deaths occurred in this series. A binary logistic regression was performed in order to predict ANIs complications (R2 Cox & Snell=7.2%, R2 Nagelkerke=23.7%). There was a significant association between toothache (OR=16,18, CI 95%[1.35-193.39], p=0.028) and neck pain (OR=19.78, CI 95%[1.62-240.08], p=0.019) on admission and the presence of complications.

After excluding patients transferred to their hospital of origin, the length of hospitalization was different between the two groups in the study, with a median stay for children of 6 days (range, 2-27 days) and 3 days (range, 2-12 days) for adolescents. The hospital stay was shorter for medically treated patients (median: 4 days) compared with those who underwent surgical drainage (median: 4,5 days) (*p*=0.012). A multiple linear regression model was performed in order to predict prolonged hospitalization (ANOVA p<0.001; R^2=71.4%, R^2_a=69.2%), and the following variables were identified as significant predictors: age below 10 years (β=-1,53 CI 95% [-3,04—0,02], p=0.047); multiple abscesses (β=2.44 CI 95% [0.41-4.46], p=0.019); presence of a palpable cervical mass on admission (β=1.76 CI 95% [0.61-2.91], p=0.003); absence of odynophagia (β=-1.43 CI 95% [-2,58- -0,272], p=0.016); pharyngeal bulging (β=-2.15 CI 95% [-3,88- -0,43], p=0.015); surgery with general anaesthesia instead of local drainage (β=-1.96, CI 95% [-3.78- -0.13], p=0.036); surgery delayed more than 24 hours (β=-5.28 CI 95% [-7,23- -3,34], p<0.001) (Table 6).

Recurrent ANIs were observed in eight patients (5%), six in the children´s group, two in the adolescents´ one (*p*=0.172). Half of the recurrences (>6weeks after the first episode) were with peritonsillar abscess and two had a branchial cyst.

DISCUSSION

Acute neck infections are an uncommon but serious problem in a paediatric population. Although antibiotic therapy might help in reducing the incidence of secondary ANIs, life-threatening complications may arise if they are not identified and treated promptly. At early stages of an ANI, children may have very subtle signs and symptoms, which demand a high index of suspicion and specific diagnostic exams.

No differences were found in the seasonal distribution of ANIs, unlike other studies that showed a predominance of the infections in winter [5].

It is plausible that ANIs may predominate in specific anatomic spaces according to the patient's age. As such, previous studies showed that peritonsillar abscesses tend to occur more frequently in older children and adolescents, whereas retropharyngeal infections are more common in younger children [3,5,10]. In the present study, this association was valid in young children but not for the older. In fact, our series showed that retropharyngeal abscesses were more common in younger children, in possible relation to the higher incidence of respiratory infections in this age group as well as to the prominent paramedian chain of lymph nodes in the retropharyngeal space that tend to involute after 5 years of age [5]. In contrast, submandibular abscesses were most frequently seen in adolescents, many of them subsequent to dental infections. These dental-related problems, represented by loss of periodontal attachment and supporting bone as well as tooth caries, are relatively uncommon in youngsters but tend to increase over the age of 12 years [11].

Contrary to adults that usually have localizing signs and symptoms, infants and younger children tend to have subtle presentations, do not verbalize their symptoms and sometimes have difficult physical examination [12]. Moreover, the clinical presentation of ANI widely overlaps with other diseases commonly encountered in children such as tonsillitis, viral pharyngitis and lymphadenitis, which may predispose to an early misdiagnosis [10].

Our findings support the study by Wong et al. [4], where the most frequent symptoms and signs were fever, odynophagia, pharyngeal bulging and neck mass. None of the children had respiratory symptoms upon admission. Although pharyngeal bulging with uvular deviation and *trismus* may alert to a peritonsillar abscess, these signs may not be so obvious in parapharyngeal and retropharyngeal abscesses. Such was also evident in the present study with several patients having fever as the only initial clinical finding of the incoming abscesses, delaying the diagnosis up to the moment when a neck mass, torticollis or nuchal pain appear, as also stressed by Metin et al. [3].

The most prevalent microorganism in aerobic bacterial cultures was *Streptococcus pyogenes*, reflecting the prevalence of oropharyngeal aetiology of ANI in this series. From the 87 samples of purulent exudate, just five were polymicrobial and no anaerobes were isolated.

Polymicrobial cultures are explained by low tissue pressures of oxygen present in the areolar tissue of the cervical spaces favouring the synergistic growth of aerobic and anaerobic bacteria [13]. The present results may be explained by the use of antibiotics before admission, the high dose of empirical antibiotics before surgical drainage and, possibly, an improper sample collection may have affected the results of microbiological tests of this study.

The treatment of ANI consists of airway control, effective ATB treatment and, when appropriate, incision and drainage of abscess. There is no universal approach to the management of ANI with respect to indications of surgical intervention, empirical choice and duration of antibiotic therapy [3]. Due to the potential life-threatening complications, hospitalization is advised in every ANI in the paediatric age. The duration of treatment should be individualized, depending on the clinical response. In abscesses with size inferior to 20mm involving a single space and without complications associated, we advocate only antibiotic treatment, with clinical revaluation 48 hours after admission.

Empirical parenteral broad-spectrum antibiotic treatment should be started immediately in patients with ANI [3]. Considering the bacteriology of ANIs, antibiotics should cover *Streptococcus, Staphylococcus* and *anaerobic* pathogens [3]. In this study, the most commonly used treatment regimens were ceftriaxone with clindamycin or ceftriaxone alone. Clindamycin should be considered an initial empiric intravenous antibiotic therapy. It is active against anaerobes (especially from the oral and oropharyngeal flora), gram-positive bacteria, all *Streptococcus* and most *Staphylococcus* penicillin-resistant. Moreover, this antibiotic is resistant to the action of β-lactamase [14].

Only 21 children (13%) were successfully managed without surgery and the majority (62%) had an abscess size <20mm.

The policy in our department recommends surgical exploration and drainage on admission when the above criteria are not met, or when patients have clinical deterioration even under iv antibiotics in the first 24-48 hours. Consequently, the present series showed a trend for early surgical treatment of these infections with more than two-thirds of the patients (86.8%) undergoing surgery in the first 24 hours, with the majority (65%) showing an abscess ≥20mm. These results are in agreement with previous studies [5,15,16] and contrast against others in which surgery was rarely performed in only one-third of the patients [3,7]. However, the success of antibiotic therapy in treating established abscesses may be overestimated in these latter series, as diagnostic inaccuracies are known to occur when using CT to differentiate between abscess and cellulitis [17]. Our results were in line with previous findings that when surgical drainage is undertaken, a transoral approach is often effective in treating most parapharyngeal and retropharyngeal abscesses (93% and 92%, respectively) [5,7]. Only if the abscess collection is lateral to the great vessels, an external approach should be considered.

Imaging techniques, especially CT, are of great value to detect abscesses and their anatomic relationship with adjacent structures, to predict the risk of impending airway compromise as well as decisively contribute to surgical planning [18]. Cellulitis may sometimes mimic an abscess on a CT scan, resulting in a false-positive diagnosis [19]. That is why, in our centre, all the CTs in ANI patients are contrast-enhanced (excepting those allergic to iodine contrast). It is possible that, in the near future, CT may be replaced by MRI – once the latter has no radiation and has better definition of the soft tissue – or even by the widespread use of threedimensional US. Also, MRI is more expensive and time-consuming exam, which may need sedation in young children, that may be sometimes a limitation to its use in emergency settings. In the present retrospective study, the accuracy, the false-positives and the positive predictive values of CT in ANIs were similar to a report by Vural et al. [17] and lower than in other two older studies [20,21]. The overall accuracy rate is 63%, indicating that CT diagnoses were not confirmed by operation findings in 27.8%. High false-positive results of CT in neck infections were reported before [20,22]. However, in the present study, the false-positive results were 17.4%. Some authors advocate that CT should be used if airway compromise and strong suspicion of ANI are present [3]. Others argue that physicians should routinely ask for a neck CT on all children with a tentative diagnosis of ANI because the insidious course of deep neck abscess does not necessarily correlate with duration of the symptoms [1]. The data of the present study demonstrate that the size of the abscess, evaluated in the imaging studies, is fundamental in the surgical option of treatment. So, a CT or MRI evaluation of all children is recommended.

In accordance with previous studies [3,23], we found that those cases which underwent surgery had a greater length of hospitalization compared to those who did only medical treatment. Duration of hospital stay was similar in the immediate and delayed-surgery groups, as also reported by other authors [5,24], possibly indicating that a trial period of medical management was not detrimental. Our experience, in agreement with other studies [5,14], indicates that younger patients and an abscess size ≥20mm are both associated with a tendency to failure in exclusive medical treatment and incur in delayed surgical drainage, even if the latter did not reach a statistically significant difference. Also, similar to other reports [5], our study indicates that an abscess size ≥20mm is significantly associated with the presence of pus at surgery. As such, abscess size may be an important indicator towards a treatment option.

Based on our clinical outcomes and on earlier publications [5,14], it is plausible that a trial of intravenous antibiotics under close surveillance for children with ANI who are clinically stable, older (≥10 years) and have abscesses <20mm may be successful and prevent further surgical drainage. However, close follow-up is mandatory as recurrence or need for drainage may be necessary.

In our revision, there was no statistically significant association between those who were prescribed only antibiotics and those who underwent surgery plus antibiotics in relation to complications. Presence of toothache and neck pain on admission seems to be associated with ANIs complications. Multiple abscess sites have been previously associated with complicated clinical courses [8].

In this study, those with longer hospitalization were younger, had multiple abscesses, had palpable cervical mass on admission, did not present odynophagia or pharyngeal bulging, were submitted to surgery with general anaesthesia instead of local drainage and were submitted to surgery 24 hours after admission.

The present study has several limitations due to its retrospective nature. There was no assurance of standardized documentation relating to the physical findings, some data on physical examinations were missing and there were no standardized criteria for documenting CT scan reports, which were performed by different radiologists. There was no pre-determined protocol to determine which child should undergo immediate surgical drainage and surgeons may have preferentially operated on those children who were younger and who had larger abscesses. Lastly, the timing for surgical intervention may have also been influenced by a surgeon decision.

CONCLUSION

The present study showed that the diagnosis and treatment of neck abscesses in paediatric patients is not straightforward, but a good outcome can be achieved without major complications. The location of the ANI appears to vary in different paediatric age groups. ANI should be considered in the differential diagnosis of children who present fever and neck mass even in the absence of more specific findings. Computer tomography is still one of the most helpful imaging exam to evaluate a child with ANI. A trial of intravenous antibiotic and close surveillance for children with ANI, aged above 10 years, who are clinically stable and have smaller abscesses, may be successful without surgery. Younger patients and big abscesses on CT should be followed carefully due to a greater risk of failure of medical treatment. Younger age, presence of multiple abscesses and a palpable cervical mass on admission are some variables associated with prolonged hospitalization. Presence of toothache and neck pain on admission was identified as possible predictors of complications.

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Table 1 – Characteristics of patients with acute neck infection by age group

Characteristics	Children (age<10 years) (n=102)	Adolescents (10-17 years) (n=57)	*p*
Male : female	53:49	27:30	0.57
Mean age (years)±SD	4.4±2.6	13.8±2.7	
Length of hospitalization (days)	6	3	0.19
Peritonsillar abscess [a]	49 (68)	23 (32)	0.28
Parapharyngeal abscess [a]	20 (71)	8 (29)	0.55
Retropharyngeal abscess [a]	11 (85)	2 (15)	0.05
Submandibular abscess [a]	13 (38)	21 (62)	<0.00
"Other abscesses" [a]	2 (100)	–	0.28
Mixed [a]	7 (70)	3 (30)	0.69

SD, standard deviation; [a]Data presented as *n (%)*

Table 2 – Clinical characteristics of patients with acute neck infection

Characteristics	Peritonsillar (*n*=72)	Parapharyngeal (*n*=28)	Retropharyngeal (*n*=13)	Submandibular (*n*=34)	Other (*n*=2)	Mixed (*n*=10)	Total (*n*= 159)
Male:female	29:43	14:14	8:5	23:11	2:0	76:73	80:79
Mean age (years)	7.61±4.68	6.75±4.33	4.64±3.95	10.53±6.53	2.01±1.41	7.22±4.52	7.73±5.23
Length of hospitalization (d)	2	6	7	7	17	10	4
Clinical presentation							
Fever	60 (86)	15 (83)	11 (85)	17 (53)	2 (100)	8 (89)	115 (64)
Dysphagia	25 (36)	10 (33)	4 (31)	1 (3)	-	2 (22)	40 (22)
Neck mass	12 (17)	12 (40)	5 (39)	34 (100)	2 (100)	3 (33)	63 (35)
Neck pain	4 (6)	6 (20)	3 (23)	1 (3)	1 (50)	1 (11)	15 (8)
Odynophagia	61 (87)	20 (67)	6 (46)	4 (13)	-	4 (44)	91 (51)
Toothache	-	1 (3)	-	17 (53)	-	-	18 (10)
Adenomegalies	40 (57)	16 (53)	8 (62)	14 (42)	1 (50)	6 (67)	79 (44)
Torticollis	8 (11)	10 (33)	5 (39)	3 (9)	-	3 (33)	26 (14)
Pharyngeal bulging	57 (81)	20 (67)	6 (46)	-	-	5 (56)	83 (46)
Trismus	10 (14)	5 (17)	-	15 (47)	-	1 (11)	30 (16.7)

[a]Data presented as mean±standard deviation, median or *n (%)*

Table 3 – Management of patients with acute neck infection

Management	Peritonsillar (*n*=72)	Parapharyngeal (*n*=28)	Retropharyngeal (*n*=13)	Submandibular (*n*=34)	Other (*n*=2)	Mixed (*n*=10)	Total (*n*= 159)
Antibiotics alone	14 (19.4)	4 (14.2)	-	3 (8.8)	-	-	21 (13.2)
Surgery	47 (65.2)	24 (85.7)	13 (100)	29 (85.3)	2 (100)	10 (100)	125 (78.6)
Local drainage	11 (15.2)	-	-	2 (5.9)	-	-	13 (8.2)
Teeth extraction	-	1 (3.6)	-	11 (32.5)	-	-	12 (7.5)
Revision surgery	1 (1.4)	4 (14.3)	3 (23.1)	-	1 (50)	6 (60)	15 (9.4)

[a]Data presented as *n (%)*

Table 4 – Pus cultures of patients with acute neck infection

Microorganisms				No. of cases	%
Non-recoverable[a]				47	54
Positive cultures				40	46
	Mixed flora[b]			5	12.5
	Aerobic/Facultative	*Streptococcus*	*pyogenes*	16	40
			anginosus	3	7.5
			parasanguinis	2	5
			gordonii	1	2.5
			mitis	1	2.5
			pneumoniae	1	2.5
			constellatus	1	2.5
			equinus	1	2.5
			sanguis	1	2.5
			Streptococcus spp	2	5
		Staphylococcus aureos		4	10
		Klebsiella pneumoniae		2	5
		Enterobacter aligenes		1	2.5

[a]Cultures in which multiple organisms grew, not being possible to identify the one responsible for the infection
[b]Includes Streptococcus anginosus, mittis, orallis, spp.; Prevotella bucae, Candida albicans

Table 5 – Complications of acute neck infections (Intensive Care Unit patients)

	Children (n=2)	**Adolescents (n=2)**
Type of complication	Airway obstruction	Airway obstruction
Type of ANI	Peritonsillar Parapharyngeal	Submandibular

Table 6 – Predictors of prolonged hospitalization

	β	**CI 95%**	***p***
Children	1.53	0.02 – 3.04	0.047
Multiple abscesses	2.44	0.41 – 4.46	0.019
Palpable cervical mass on admission	1.76	0.61 – 2.91	0.003
Odynophagia	-1.43	-2.58 – -0.27	0.016
Pharyngeal bulging	-2.15	-3.88 – -0.43	0.015
Surgery	1.96	0.13 – 3.78	0.036

Figure 1 – Annual distribution of acute neck infections.

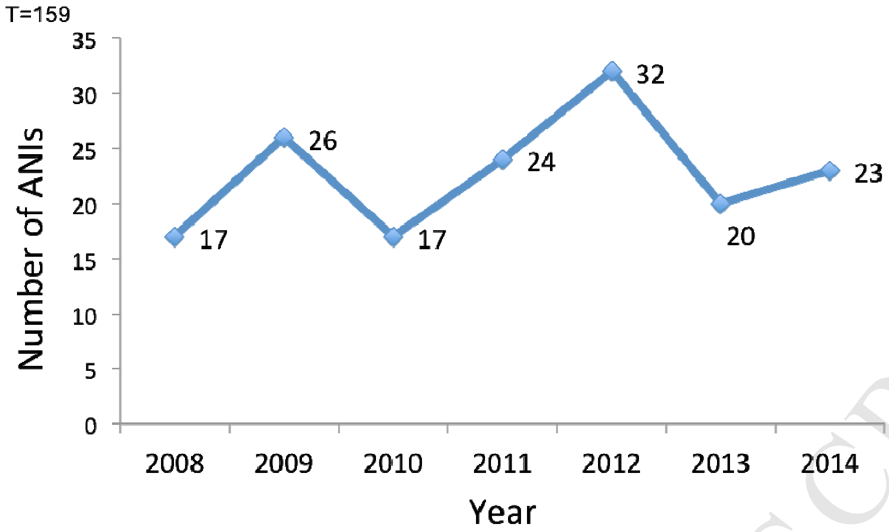

Figure 2 – Distribution of different sites of acute neck infection by age group

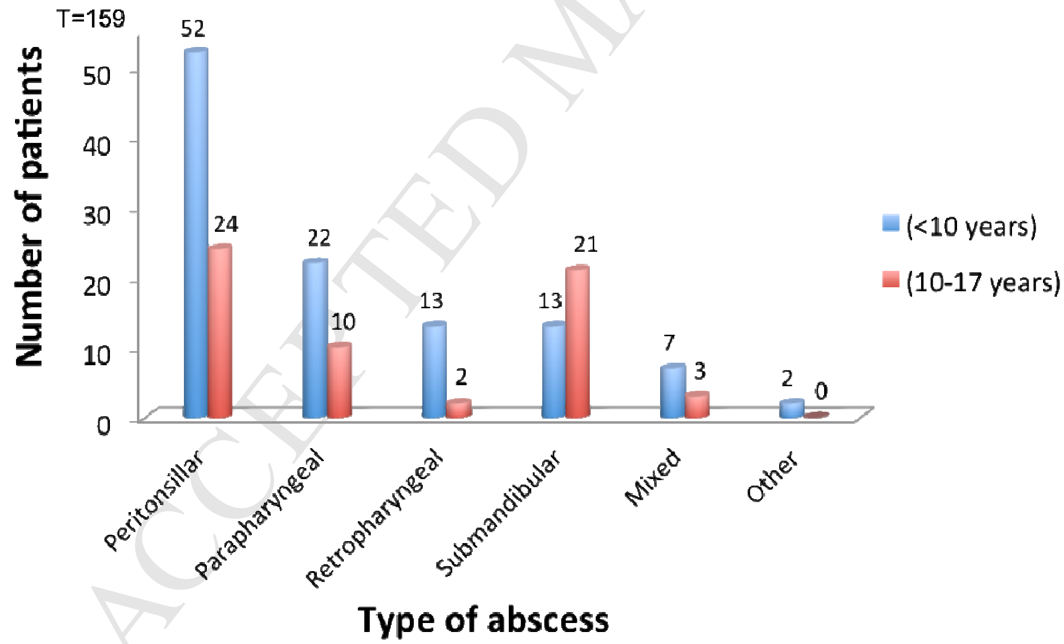

Figure 3 – Aetiology of acute neck infections