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Clinicopathological Spectrum of Non-Thyroidal head and Neck Swellings at a Tertiary Care Centre in Andhra Pradesh, India: A Cross-Sectional Study

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ABSTRACT: **Background**: Head and neck swellings are frequent in surgical and otorhinolaryngological practice and range from inflammatory to malignant lesions. Published data from tertiary centres in Andhra Pradesh are limited.

Methods: This hospital-based cross-sectional study with histopathological correlation was conducted in the Department of General Surgery, Chittoor, between November 2022 and May 2024. All patients with palpable non-thyroidal swellings were evaluated clinically, with fine-needle aspiration cytology (FNAC) and excisional biopsy as indicated. Demographic, clinical, cytological, histopathological and treatment data were analysed descriptively.

Results: Of 116 patients, 67 (57.8%) were male. The mean age was 40.97 years (SD 18.93), and the 41–60-year group was largest (35.3%). Swellings were usually solitary (85.3%), cystic or soft (75.0%) and non-fixed (95.7%). The commonest histopathological diagnoses were sebaceous cyst (24.1%), dermoid cyst (19.0%) and lipoma (19.0%). Squamous cell carcinoma was confirmed in three patients (2.6%). FNAC was not performed in 57.8% of patients. Excision was the commonest treatment (73.3%), and 97.4% of patients were recorded as recovered.

Conclusions: Benign cystic and lipomatous lesions predominated, but malignant and infective diagnoses were not negligible. Systematic tissue diagnosis, particularly for firm or fixed swellings, is warranted.

INTRODUCTION

Swellings of the head and neck are among the most frequent reasons for referral to general surgery and otorhinolaryngology clinics. They arise from skin and subcutaneous tissue, muscles, bone, lymphatics, salivary glands and the contents of the neck

triangles, and span congenital, inflammatory, infective, benign neoplastic and malignant causes[1,2]. The sternocleidomastoid muscle divides the neck into anterior and posterior triangles, each subdivided into smaller triangles whose contents guide the differential diagnosis of a swelling at a given site[2,3].

The likely cause varies with age. In children, congenital lesions such as cystic hygroma, branchial cysts and sternocleidomastoid tumour of infancy, together with inflammatory nodes, predominate[4,5,6]. In adults, a persistent or firm mass warrants exclusion of malignancy, because squamous cell carcinoma, lymphoma and salivary or thyroid tumours may first present as a swelling[7,8]. Carotid body tumours and midline lesions form a further group that requires specific assessment[9,10]. Systemic and inflammatory diseases can also produce multiple swellings and should be considered when more than one site is involved[11,12].

Neck swellings can be classified by anatomical origin (the triangle or fascial space involved), by tissue of origin (cutaneous, lymphatic, glandular, neural or vascular), or by pathological category (congenital, inflammatory, infective, benign neoplastic or malignant)[2]. Each system has value. The anatomical approach guides examination, whereas the pathological approach guides investigation and treatment. This study uses both to organise its findings.

Clinical assessment alone is often insufficient. Fine-needle aspiration cytology (FNAC) is minimally invasive, rapid and inexpensive, and gives a preliminary tissue diagnosis, whereas excisional biopsy with histopathology is the reference standard[13,14]. Reported agreement between cytology and histopathology varies between series; one prospective study reported a sensitivity of 71.4% and a specificity of 98.9% for FNAC[15], which supports pairing the two methods.

Most published series of non-thyroidal neck swellings come from India and Bangladesh[16,17,18,19]. These series differ in age predominance, sex ratio and case mix, which reflect local disease burden and referral patterns. Tuberculous lymphadenitis, for example, remains relevant where tuberculosis is common[20,21]. Data from tertiary centres in Andhra Pradesh are limited. We therefore describe the clinicopathological spectrum of non-thyroidal head and neck swellings at a tertiary care centre in Chittoor. Thyroid swellings were excluded because they form a separate clinical and pathological literature.

Clinical decisions about a neck swelling depend on separating lesions that need urgent investigation from those that can be observed or removed electively. A structured approach that combines history, anatomical location, consistency and mobility with targeted investigation is therefore essential. In resource-constrained settings, diagnostic thoroughness must be balanced against cost, time and patient burden, which makes locally generated data on the frequency and pattern of each entity especially useful for planning services and training.

The objectives were to (i) describe the age, sex, anatomical and clinical characteristics of the swellings; (ii) correlate the clinical diagnosis with FNAC and histopathological findings; (iii) summarise treatment and outcomes; and (iv) examine the commonest swellings across age groups.

METHODS

Study design and setting. This hospital-based cross-sectional study with histopathological correlation was conducted in the Department of General Surgery, Apollo Institute of Medical Sciences and Research (AIMSR), Chittoor, Andhra Pradesh, India, from November 2022 to May 2024. Patients were recruited from the outpatient and inpatient services of the department and of the district headquarters hospital, Chittoor. The report follows the STROBE statement for cross-sectional studies[22].

Participants. All patients of any age or sex who presented with a palpable non-thyroidal head and neck swelling during the study period were eligible. Thyroid and thyroid-associated swellings, and swellings of the eyelids and pinna, were excluded. Patients in whom neither FNAC nor excisional biopsy could be performed were excluded. Enrolment was time-bound, and 116 patients met the criteria. No formal sample-size calculation was reported.

Ethics. The study was approved by the Institutional Ethics Committee of AIMSR (reference PG/014/IEC/AIMSR/2022, dated 7 November 2022, after review at the meeting of 27 October 2022). Participants were given an information sheet and an informed consent form.

Variables and data collection. After a detailed history and clinical examination, each patient was assessed for site, side (right, left, midline or bilateral), number of swellings, duration, consistency (cystic, soft, firm or hard), fixity to surrounding structures, pain, fever, scar or sinus, associated cervical lymphadenopathy, and past medical and family history. A provisional clinical diagnosis was recorded. Routine investigations (haemoglobin, total and differential leucocyte counts, erythrocyte sedimentation

rate, Mantoux test, chest radiograph and polymerase chain reaction where indicated) were requested according to the presumed diagnosis. Sputum examination for acid-fast bacilli was reserved for suspected tuberculous lymphadenitis.

Tissue diagnosis. FNAC was performed after clinical assessment. Biopsy was performed when FNAC was negative or doubtful. Excised lesions, including cystic hygromas, branchial cysts, lipomas and other removable swellings, were sent for histopathological examination. Metastatic work-up was undertaken where the primary was unknown. Treatment modality and outcome (recovered or referred to a higher centre) were recorded. Structured follow-up was not undertaken.

Data management. Clinical, cytological, histopathological and treatment data were recorded on a standard proforma (dissertation Annexure II) and compiled into a master chart, from which the tables were generated. Histopathology reports were treated as the reference standard for tissue diagnosis wherever they were available.

Operational definitions. Consistency was categorised on palpation as cystic (fluctuant or fluid-like), soft, firm or hard. Fixity was defined as immobility of the swelling relative to the overlying skin or deeper structures on examination. Laterality was recorded as right, left, midline or bilateral, and swellings that could not be lateralised were recorded separately. Diagnoses were recorded at three stages: the provisional clinical diagnosis, the FNAC diagnosis where FNAC was performed, and the histopathological diagnosis where biopsy or excision was performed. Each tabulated distribution was checked to sum to the 116 participants.

Statistical analysis. Data were coded and entered in Microsoft Excel and analysed with SPSS version 22 (IBM Corp., Armonk, NY, USA). Categorical variables are presented as counts and percentages of the 116 participants, and age as mean and standard deviation. As the study was descriptive, no inferential tests were performed and no causal association is claimed. Confidence intervals were not calculated, so the proportions should be interpreted with the sample size of 116 in mind.

RESULTS

Of the 116 patients, 67 (57.8%) were male and 49 (42.2%) were female, a male-to-female ratio of 1.4:1. The mean age was 40.97 years (SD 18.93). The 41–60-year group was the largest (41; 35.3%), followed by 21–40 years (34; 29.3%), under 20 years (23; 19.8%) and 61–80 years (18; 15.5%) (Table 1, Figure 1). Males predominated in the 21–40-year (23 vs 11) and 61–80-year (12 vs 6) groups, whereas the sexes were similar in the under-20 and 41–60-year groups.

Table 1. Baseline characteristics of patients with non-thyroidal head and neck swellings (N = 116)

Characteristic	Category	n	%
Age, mean (SD), years	—	116	40.97 (18.93)
Age group	<20 years	23	19.8
	21–40 years	34	29.3
	41–60 years	41	35.3
	61–80 years	18	15.5
Sex	Male	67	57.8
	Female	49	42.2
Side	Right	52	44.8
	Left	45	38.8
	Midline	3	2.6
	Bilateral	1	0.9
	Not lateralised	15	12.9

Percentages are of N = 116. Source: dissertation Tables 1–5.

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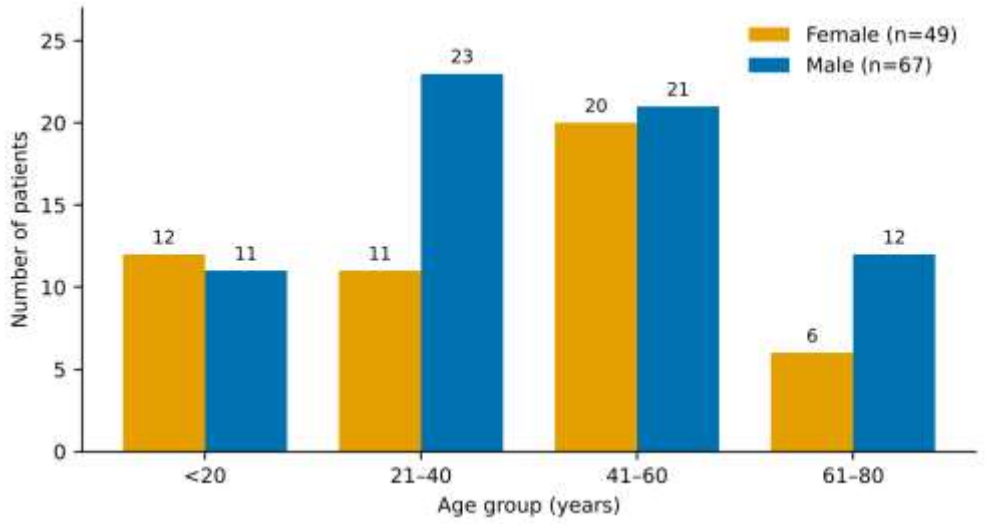


Figure 1. Age distribution of patients with non-thyroidal head and neck swellings, by sex (N = 116). Source: dissertation Table 4.

The right side was affected in 52 patients (44.8%) and the left in 45 (38.8%). Midline swellings numbered three (2.6%), bilateral swellings one (0.9%), and 15 (12.9%) were not lateralised (Table 1).

Swelling was the presenting complaint in all patients (Table 2). Pain was reported by 21 (18.1%), a scar or sinus by 7 (6.0%) and fever by 6 (5.2%). Most patients had a solitary swelling (99; 85.3%), while 17 (14.7%) had two to five. Swellings were cystic in 48 (41.4%), soft in 39 (33.6%), firm in 26 (22.4%) and hard in 3 (2.6%) (Figure 4). Only five (4.3%) were fixed. Associated cervical lymphadenopathy was present in one patient (0.9%). Most patients reported symptoms for more than one year. No patient had a family history of similar swellings. Past medical history was unremarkable in 108 (93.1%); trauma was recorded in five (4.3%) and a benign parotid tumour, dermoid cyst and multinodular goitre in one each (0.9%).

Table 2. Clinical characteristics of the swellings (N = 116)

Feature	Category	n	%
Number of swellings	Solitary	99	85.3
	Two to five	17	14.7
Consistency	Cystic	48	41.4
	Soft	39	33.6
	Firm	26	22.4
	Hard	3	2.6
Fixity	Not fixed	111	95.7
	Fixed	5	4.3
Associated symptoms	Pain	21	18.1
	Scar or sinus	7	6.0
	Fever	6	5.2
Associated cervical lymphadenopathy	Present	1	0.9

Past medical history	None	108	93.1
	Trauma	5	4.3
	Benign parotid tumour, dermoid cyst, multinodular goitre (1 each)	3	2.6
Family history	None	116	100.0

Percentages are of N = 116. Multiple symptoms may co-occur. Source: dissertation Tables 6–10 and 11.

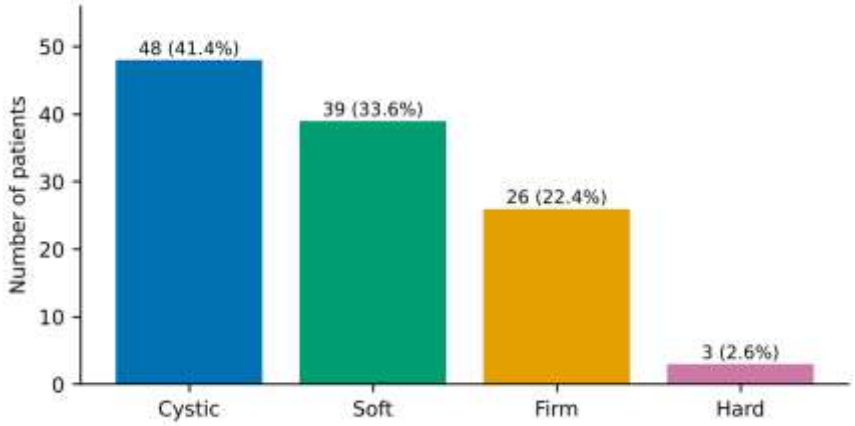


Figure 4. Consistency of swellings on clinical examination (N = 116).

FNAC was performed in 49 patients (42.2%), and 67 (57.8%) did not undergo it. Biopsy or excision was performed in 109 patients (94.0%). Among the FNAC specimens, the commonest diagnoses were lipoma (21), reactive lymphadenitis (11), pleomorphic adenoma (5) and abscess (4). Tuberculous lymphadenitis was identified in three, squamous cell carcinoma in one and chronic granulomatous lymphadenitis in one (Table 3). Among the 49 patients who underwent FNAC, lipoma was the largest group (21; 42.9%), followed by reactive lymphadenitis (11; 22.4%).

Table 3. Clinical, cytological and histopathological diagnoses of the commonest entities (n/N, % of N = 116)

Diagnosis	**Clinical**	**FNAC (n = 49 performed)**	**Histopathology (n = 109 performed)**
Sebaceous cyst	27 (23.3)	0	28 (24.1)
Dermoid cyst	25 (21.6)	0	22 (19.0)
Lipoma	21 (18.1)	21 (18.1)	22 (19.0)
Lymphadenopathy (reactive)†	14 (12.1)	11 (9.5)	8 (6.9)
Mucous retention cyst	5 (4.3)	0	5 (4.3)
Pleomorphic adenoma	—	5 (4.3)	5 (4.3)
Abscess	5 (4.3)	4 (3.4)	—
Tuberculous lymphadenitis	2 (1.7)	3 (2.6)	3 (2.6)
Squamous cell carcinoma	4 (3.4)‡	1 (0.9)	3 (2.6)

Chronic granulomatous lymphadenitis	—	1 (0.9)	1 (0.9)
Not performed	—	67 (57.8)	7 (6.0)

† Clinical entry is 'cervical lymphadenopathy'; FNAC and histopathology entries are reactive lymphadenitis. ‡ Clinically suspected carcinoma of buccal mucosa (3) or lip (1). Counts are not patient-linked across methods. Source: dissertation Tables 12, 14 and 20.

The commonest histopathological diagnoses were sebaceous cyst (28; 24.1%), dermoid cyst (22; 19.0%) and lipoma (22; 19.0%). These were followed by reactive lymphadenitis (8; 6.9%), mucous retention cyst (5; 4.3%) and pleomorphic adenoma (5; 4.3%) (Table 3, Figure 2). Squamous cell carcinoma was confirmed in three patients (2.6%), and tuberculous lymphadenitis in three (2.6%). Chronic granulomatous lymphadenitis was recorded once (0.9%). Squamous cell carcinoma therefore accounted for 2.8% of the 109 patients who had histopathology. Parotid lesions were prominent, with five parotidectomies performed and pleomorphic adenoma and parotid abscess recorded on histopathology. Rarer entities, each recorded once or twice, included capillary haemangioma, pyogenic granuloma, epulis, foreign body and parotid abscess.

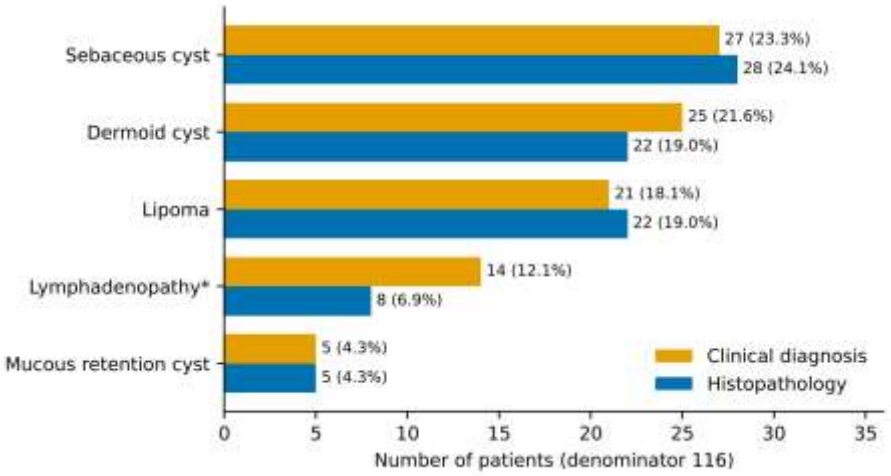


Figure 2. Commonest clinical and histopathological diagnoses (N = 116). *Clinical entry is cervical lymphadenopathy; histopathology entry is reactive lymphadenitis.

The provisional clinical diagnoses were sebaceous cyst (27; 23.3%), dermoid cyst (25; 21.6%), lipoma (21; 18.1%) and cervical lymphadenopathy (14; 12.1%). Carcinoma of the buccal mucosa or lip was suspected in four patients (3.4%), and basal cell carcinoma in two (1.7%). Patient-level linkage of clinical, cytological and histopathological diagnoses was not available in the source data, so sensitivity, specificity and agreement could not be calculated. On aggregate counts, lipoma was identified clinically in 21 patients, by FNAC in 21 and histopathologically in 22. Reactive lymphadenitis was recorded in 11 on FNAC and in eight on histopathology.

Excision was the commonest treatment (85; 73.3%), followed by antibiotics (11; 9.5%), incision and drainage (6; 5.2%), antitubercular therapy (3; 2.6%), superficial parotidectomy (4; 3.4%) and wide local excision (2; 1.7%). One patient underwent total parotidectomy and one wide local excision with hemimandibulectomy (0.9% each) (Table 4, Figure 3). Three patients (2.6%) were referred to a higher centre, and 113 (97.4%) were recorded as recovered. Diagnoses were not cross-tabulated by age group in the available data, so the commonest swellings within each age group are not reported.

Table 4. Treatment and outcome (N = 116)

Management	**n**	**%**
Excision	85	73.3
Antibiotics	11	9.5

Incision and drainage	6	5.2
Superficial parotidectomy	4	3.4
Antitubercular therapy	3	2.6
Referred to higher centre	3	2.6
Wide local excision	2	1.7
Total parotidectomy	1	0.9
Wide local excision with hemimandibulectomy	1	0.9
Outcome: recovered	113	97.4

Each patient is counted once (categories sum to 116). Source: dissertation Tables 21 and 22.

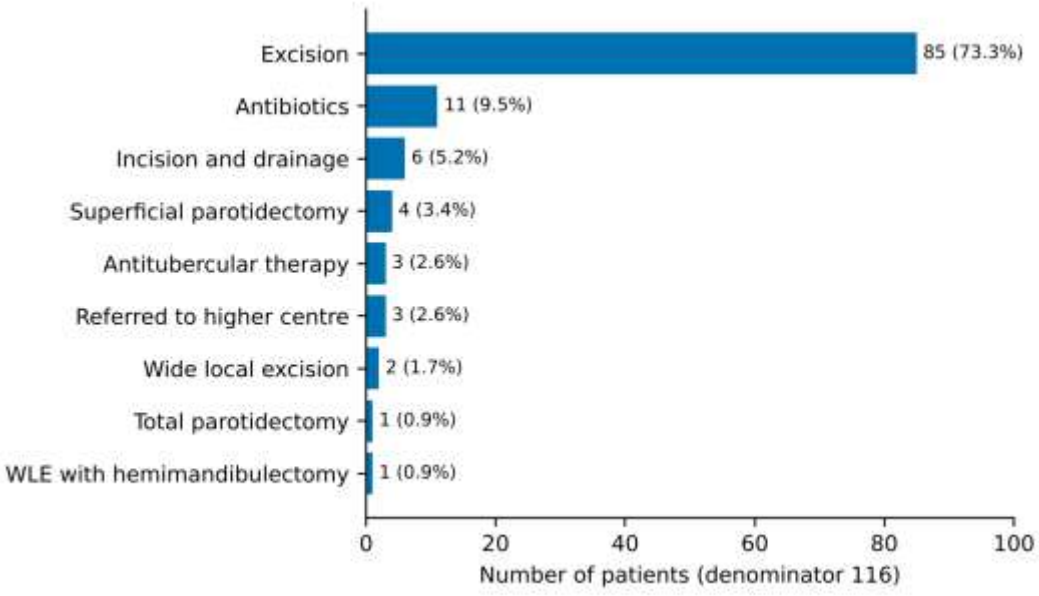


Figure 3. Treatment modalities administered (N = 116). Categories are mutually exclusive.

DISCUSSION

Principal findings. In 116 patients with non-thyroidal head and neck swellings, the disease was most frequent in middle-aged adults and in males. Most swellings were solitary, cystic or soft and non-fixed. Sebaceous cysts, dermoid cysts and lipomas together accounted for 62.1% of histopathological diagnoses. Squamous cell carcinoma was confirmed in 2.6%, and surgical excision was the predominant treatment. These patterns are descriptive and come from a single centre, but they provide a baseline for local service planning and for comparison with future series.

Age and sex. The peak in the 41–60-year group differs from several series that report a younger peak, most often at 21–30 years[15,16,23]. Such differences may reflect referral patterns, local demography and the proportion of patients sampled, rather than true differences in occurrence. The male predominance (1.4:1) is lower than the 1.9:1 reported in a FNAC–histopathology correlation study[24], and well below the 4.2:1 ratio reported for head and neck cancers in northern India[18]. Those series differ in case mix, so the comparison is indicative only. The male excess in the 21–40- and 61–80-year groups rests on small numbers and should be treated as a hypothesis rather than an established sex-specific pattern.

Age and diagnostic approach. Just over half of the patients (50.9%) were older than 40 years, an age at which a persistent or firm swelling requires careful exclusion of malignancy[7]. Age alone, however, cannot separate benign from malignant swellings.

Consistency, fixity and duration should be assessed alongside age, and no single feature should be used in isolation to decide whether tissue sampling is needed.

Laterality. The right-sided predominance (44.8% vs 38.8% left) is a descriptive observation, and the difference, 52 vs 45 patients, was not tested. To our knowledge, side-specific distributions are rarely reported. Habits that favour one side of the mouth, such as unilateral chewing of tobacco or betel quid, could contribute to side-specific pathology, but these exposures were not recorded in this study.

Clinical features. The predominance of solitary swellings (85.3%) fits the view that solitary swellings usually arise from a single gland or node[1], whereas multiple swellings should prompt a search for systemic disease such as sarcoidosis, Kawasaki disease or vasculitis[11,12]. The present data do not allow such an assessment. Cystic and soft consistencies predominated (75.0%), in keeping with the benign nature of most lesions. Firm swellings (22.4%) were more common than hard ones (2.6%). A clinicopathological study of lateral neck swellings reported that two-thirds were firm[17], a difference that may reflect case mix and the exclusion of thyroid lesions here. Fixity was present in 4.3%. Although fixity is not specific, it warrants prompt evaluation for invasive disease[7,8].

Diagnostic yield of FNAC and histopathology. FNAC was not performed in 57.8% of patients, and the reasons were not recorded. Lipoma and cyst diagnoses are often made clinically, but the same practice risks missing less common lesions such as carcinoma and tuberculosis. Several series show that FNAC is useful in non-thyroidal lymph node and salivary lesions[13,25,26], and that cytology correlates reasonably with histopathology[15,24]. In our data, FNAC identified squamous cell carcinoma (n = 1) and tuberculous lymphadenitis (n = 3), while histopathology recorded three of each type. Concordance could not be quantified, because the source data did not link individual patients across methods. This is the main analytical gap relative to our first objective.

Common benign entities. Sebaceous cysts were the single most frequent histopathological diagnosis (24.1%). They arise from occluded pilosebaceous units and are commonly found on the scalp, face and neck, so their prominence in a neck series is expected. Dermoid cysts, which develop from ectodermal inclusions along embryonic fusion lines, were the second most frequent entity and are a well-recognised cause of swellings in the midline and submental regions. Lipomas were identified by FNAC in 21 of the 49 patients who were aspirated and by histopathology in 22, so the two methods showed close agreement in aggregate for this entity, although patient-level agreement could not be assessed.

Spectrum of diagnoses. Most lesions were benign. Sebaceous cysts, dermoid cysts and lipomas were the most common, followed by reactive lymphadenitis, mucous retention cysts and pleomorphic adenomas. Mucous retention cysts are recognised in the head and neck, including the nasopharynx[27], and dermoid and epidermoid cysts are described in clinical series[28]. Infective causes, namely abscesses and tuberculous and chronic granulomatous lymphadenitis, were uncommon but clinically important. Granulomatous inflammation of cervical nodes is not confined to high-burden settings[29], although tuberculous lymphadenitis remains a key differential in India[20,21]. Carcinoma was confirmed in three patients, and four further patients had clinically suspected oral or lip carcinoma. Two suspected basal cell carcinomas do not appear among the histopathological categories. Capillary haemangioma, a vascular lesion of infancy, was recorded once[30]. No congenital lesion such as cystic hygroma or branchial cyst appeared in the histopathological categories, although these were anticipated in the methods. This is plausible in a cohort in which children under 20 years made up 19.8% of patients.

Infective and granulomatous lesions. Tuberculous lymphadenitis was identified in three patients by FNAC and confirmed in three by histopathology, which suggests that cytology is useful for this entity once it is considered. Antitubercular therapy was given to three patients, although microbiological confirmation was not systematically sought, because sputum examination for acid-fast bacilli was reserved for suspected cases. Chronic granulomatous lymphadenitis was recorded once by each method. Infective lesions therefore need a deliberate search, because they may be overlooked when the clinical impression favours a benign cyst or lipoma.

Malignancy and risk. Squamous cell carcinoma was confirmed in three patients, and four further patients were clinically suspected of carcinoma of the buccal mucosa or lip. Oral and buccal cancers form an important part of head and neck malignancy in India[18], and the presence of carcinoma in a neck series underlines the need to examine the primary site. Tobacco and alcohol use, the principal risk factors, are not reported in the summary data, so their contribution cannot be determined. Future studies should record these exposures and the site of the primary tumour in suspected metastatic disease.

Treatment and outcome. Excision predominated (73.3%), reflecting definitive management of removable lesions. Antibiotics or antitubercular therapy were used in 12.1%. Parotidectomy was performed in five patients, and one underwent wide local excision with hemimandibulectomy, which indicates that more extensive surgery was needed for parotid and suspected malignant lesions. Recovery was recorded in 97.4%, and 2.6% were referred to a higher centre, which is consistent with the need for specialist care in complex cases. However, outcome was recorded without structured follow-up. Recurrence, complications and patient-reported outcomes therefore cannot be assessed.

Implications for surgical practice. Most lesions were managed by excision, incision or antibiotics, which are within the scope of a general surgical unit. Parotid, oral and mandibular procedures required more specialised input, and the three referrals (2.6%) suggest that such cases were recognised. Whether referrals were timely, and what happened to referred patients, cannot be judged from these data.

Strengths and limitations. The study has defined eligibility criteria, ethical approval, a defined tissue-diagnosis pathway, and a full description of clinical features. Its limitations are substantial. It is single-centre, with time-bound rather than consecutive enrolment, and no sample-size calculation was reported. Thyroid swellings were excluded, so the study does not describe the full range of neck masses. FNAC was not performed in more than half of patients, and histopathology was available for those selected for biopsy or excision, which introduces selection and verification bias. Because tissue sampling was reserved for selected patients, the sample may over-represent clinically obvious benign lesions. Patient-level concordance, age-stratified diagnoses and follow-up data were not available. Because only descriptive statistics were used, the associations described are hypotheses for future testing.

Implications. A practical pathway could begin with clinical assessment of fixity, consistency and duration, followed by FNAC for firm, fixed or atypical swellings and for patients over 40 years, with excision and histopathology for removable lesions. Clinicians should maintain a low threshold for tissue diagnosis, particularly for firm or fixed swellings and for patients over 40 years, and should consider tuberculous and granulomatous causes in the relevant clinical setting. Future multicentre prospective studies should pair cytology and histopathology at the patient level, record reasons for not sampling, stratify diagnoses by age and sex, and report follow-up.

Conclusions

Non-thyroidal head and neck swellings at this tertiary centre affected mainly middle-aged adults. Most were solitary, cystic or soft and non-fixed, and most were benign on histopathology, with sebaceous cysts, dermoid cysts and lipomas predominating. Squamous cell carcinoma and infective lesions were uncommon but present. Systematic tissue diagnosis, especially for firm or fixed swellings, should be emphasised. Prospective multicentre studies with patient-level linkage of cytology and histopathology are needed to confirm these patterns. For clinicians, the findings support a low threshold for FNAC in firm, fixed or atypical swellings. For surgeons, they highlight the need for specialist planning when parotid, oral or mandibular structures are involved.

Declarations

Ethics approval: Institutional Ethics Committee, AIMSR, Chittoor (PG/014/IEC/AIMSR/2022).

Consent: Written informed consent was obtained from participants [authors to confirm consent procedure for each patient].

Funding: [To be completed by the authors]

Conflicts of interest: [To be completed by the authors]

Data availability: [To be completed by the authors; de-identified data may be shared on reasonable request]

Author contributions: [To be completed by the authors]

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