SHORT PAPER SESSION D2

D2.1 Radiological evaluation and classification of laryngeal injuries: Retrospective case analysis

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Background

Laryngeal fractures, though uncommon, are a potentially life-threatening consequence of blunt neck trauma.[1] Timely and accurate radiological assessment is increasingly valuable for prompt diagnosis and management to optimise patient outcomes. Whilst computed tomography (CT) remains gold standard, variations in imaging findings and classification pose challenges in determining severity and appropriate treatment approach.

Purpose

1.   Highlight common radiological features on CT in patients with laryngeal injury
2.   Outline the principles of the Schaefer Fuhrman classification (with image examples)
3.   Discuss evolving trends in management of laryngeal injuries with relation to the above

Summary of content

We present 19 cases of laryngeal injuries identified between 2018 and 2024, for their radiological and clinical findings. The most common mechanism of injury was assault (42%), followed by sports-related trauma (21%), accidental blunt trauma (21%), and hanging (16%). CT imaging played a pivotal role in diagnosis, with fractures predominantly involving the thyroid cartilage. The Schaefer-Fuhrman classification was applied to assess injury severity, with higher-grade injuries correlating with airway compromise. Flexible nasendoscopy findings were reviewed alongside CT imaging to assess vocal cord function and soft tissue involvement. Management strategies varied according to severity, with most patients undergoing conservative treatment and one patient referred to a tertiary centre for further evaluation and consideration of surgical intervention. Majority had good voice outcomes. This study highlights the indispensable role of radiological evaluation in diagnosing laryngeal injuries, assessing airway risk, and guiding management strategies. An established classification system is highlighted to demonstrate pertinent review areas to reporting radiologists.

1. Moroco, A.E. et al. (2022) 'Systematic Review of Laryngeal Fractures and Trends in Operative Management', Craniomaxillofacial Trauma & Reconstruction, 16(1), pp. 62–69.

D2.2 Encouraging a patient-centred approach to education, designing an eLearning platform to enhance knowledge of HPV positive head and neck cancer: A Delphi Consensus Study

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Background

Global rises in head and neck cancer (HNC) rates are evident, with Human Papillomavirus (HPV) accounting for 71% (US) and 51.8% (UK) of all oropharyngeal squamous cell carcinomas (OPSCC)(Lechner, et al. 2022). In 2019 the UK introduced vaccinating adolescent boys for gender-neutral approaches to prevention. However, vaccine uptake remains below target, especially among males, who are high risk. Upon reflection, improved and accessible educational resources are needed, to enhance early detection, prevention and support patient management.

Method

By recruiting a panel of 16 experts with personal/professional experience in HNC, education, virology and cancer awareness and prevention, the Delphi method was employed to reach a consensus on areas of priority, key target audiences and the accessibility/delivery to help design appropriate eLearning resources.

Results

There was 100% response rate for rounds 1 and 2; and 93% for round 3. Thematic analysis was used to derive a consensus which showed that 3 eLearning resources would be optimal; for areas of priority of 'awareness and prevention', 'support through/beyond diagnosis' and 'support for healthcare professionals', focusing on each intended audiences' specific needs. Accessibility was deemed an additional priority, with supplementary resources and a national awareness campaign also highlighted to maximise reach.

Conclusion

The Delphi process proved a robust and effective method for identifying and targeting the scope for the design and production of an eLearning platform on HPV+HNC. The expert panel emphasised the requirement for accessibility through interactive eLearning and tailoring content to specific audiences using multiple eLearning resources to address health inequalities.

Lechner, M., Liu, J., Masterson, L. and Fenton, T.R., 2022. HPV-associated oropharyngeal cancer: epidemiology, molecular biology and clinical management. Nature reviews Clinical oncology, 19(5), pp.306-327.

D2.3 Beyond the usual suspects: Exploring the rarer differentials of cervical lymphadenopathy in adults

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Cervical lymphadenopathy in adults is a common presenting symptom with a vast range of benign and malignant differential diagnoses. Consequently, most patients require further radiological investigation with definitive histological sampling. In this pictorial presentation, we aim to showcase the differential diagnoses for cervical lymphadenopathy in adults and where possible, aim to highlight the salient radiological features that aid in differentiating benign from malignant aetiologies.

A retrospective analysis was conducted on adult patients presenting to our radiology department with cervical lymphadenopathy over the last 10 years. Imaging studies, including ultrasound, CT, and MRI, were reviewed. Where possible, histological reports were reviewed and key radiological characteristics such as lymph node size, shape, enhancement, and ancillary findings were recorded.

Our findings indicate that cervical lymphadenopathy in adults is a common presenting symptom with variable aetiologies. In most scenarios, further investigative work up was required due to the overlap of imaging findings. In our case series, we identified a series of cases showcasing the malignant and non-malignant causes of cervical lymphadenopathy, including benign idiopathic proliferative diseases such as Rosai-Dorfman disease and Kikuchi-Fujimoto disease, a rare subacute necrotising lymphadenitis. Where possible, we have identified radiological features that would help differentiate such pathologies.

Accurate radiological diagnosis of cervical lymphadenopathy in adults is challenging. However, our study showcases some of the salient features to help guide diagnosis, and the importance of a systematic imaging approach to enhance radiological recognition and improve diagnostic accuracy leading to more effective and timely patient care.

D2.4 A clinical audit project (CAP) assessing BHRUT radiology departments' use of the BTA grading system for sonographically detected thyroid nodules

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A clinical Audit Project (CAP) undertaken to find out if BHRUT radiology departments utilise the BTA grading system to grade all thyroid nodules detected sonographically . (BHRUT = Barking, Havering & Redbridge University NHS Hospitals Trust; BTA = British Thyroid Association).

Background

BHRUT undertakes a huge number of thyroid ultrasound scans. In 2017, BHRUT adopted the BTA thyroid nodule grading system, however, aside from a few simple service evaluations, no full-fledged CAP has ever been conducted to assess whether all sonographically detected thyroid nodules are graded – and nodule descriptors and appropriate recommendations penned on report.

Methods

Retrospective, quantitative - involved reviewing stored ultrasound reports covering a 16 months' period, and these were stratified into radiologist and sonographer reports. Data collection utilized a stratified sampling frame which was subjected to simple random sampling in each of the above study strata (radiologists & sonographers) to generate an audit sample (80). Data analysis was accomplished by use of IBM SPSS software version 24.

Results - summary table of main findings:

	Audit criterion	Target (%)	Sonographers compliance	Radiologists Compliance	Overall departmental compliance
1	Grading statement written on report	100	91.8% (45/49)	93.5% (29/31)	92.5% (74/80)
2	Nodule descriptor written on report	100	20.4% (10/49)	41.9% (13/31)	28.8% (23/80)
3	Recommendation written on report	100	36.7% (18/49)	87.1% (27/31)	56.2% (45/80)

Conclusion

A lot still desires to be done in order to improve thyroid nodule ultrasound reporting (stating the nodule grade, descriptor and making appropriate recommendations on the report).

Results - summary table of main findings:

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D2.5 Clinicopathological characteristics and survival outcomes of patients with nasopharyngeal carcinoma treated with definitive chemoradiation at a major radiotherapy center in Ghana

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Background
This study aimed to determine the survival outcomes and clinic-pathological characteristics of patients with Nasopharyngeal Cancer (NPC) who were treated with chemo-radiation in Ghana.

Methods
A retrospective cohort study was conducted, and data was collected from the files of patients who received curative chemo-radiation treatment for NPC between 2012 and 2021.

Results
A total of 83 patients were included in the study, comprising 58 (69.9%) being male and 23 (30.1%) females. A few (n=6, 7.2%) of them had co-morbidities such as asthma, hypertension, respiratory distress, and diabetes. The majority of patients had a performance status level of O (n=64, 77.1%) and most of them were at clinical stage IVB (n=32, 38.6%). The most common types of NPC were the non-keratinized undifferentiated type (n=53, 63.9%), non-keratinizing differentiated squamous cell carcinoma (SCC) (n=24, 28.9%), and keratinizing differentiated type (n=6, 7.2%). Three-Dimensional (3D-Conformal) (n=38, 45.8%), Intensity Modulated Radiotherapy (IMRT) (n=27, 32.5%), and 2-Dimensional (2D) (n=18, 21.7%) were the common treatment techniques. The majority of patients received a total tumor dose of 70 Gy. The study found that the mean survival time for Disease Free Survival (DFS) and Overall Survival (OS) were 32.3+27.3 and 43.6+27.1 months, respectively. The log-rank test showed a significant association between DFS and Radiotherapy technique (P < 0.0001) and Radiotherapy dose (P < 0.018).

Conclusion
This study provides substantial evidence supporting the correlation between clinic-pathological characteristics, treatment techniques (with a focus on 3D conformal radiotherapy), radiation treatment dose on survival outcomes in NPC patients treated with definitive chemo-radiation.

Stage	Mean				Median			
	Estimate	Std. Error	95% Confidence Interval		Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound			Lower Bound	Upper Bound
Stage-I	56.000	.000	56.000	56.000	56.000	.	.	.
Stage-II	50.000	6.439	37.380	62.620	53.000	17.065	19.553	86.447
Stage-III	44.235	6.204	32.076	56.395	38.000	2.058	33.966	42.034
Stage-IVA	44.955	5.790	33.607	56.303	36.000	9.381	17.614	54.386
Stage-IVB	39.344	5.358	28.843	49.844	30.000	2.828	24.456	35.544
Overall	43.446	2.975	37.616	49.276	36.000	2.530	31.040	40.960

a. Estimation is limited to the largest survival time if it is censored.

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3. ZHANG W, et al. (2020). Histological Subtype Remains a Significant Prognostic Factor for Nasopharyngeal Carcinoma: A Propensity Score-matched Analysis of the SEER database. Front Oncol, 10.
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D2.6 Modelling normative brain growth in childhood to enable radiotherapy toxicity assessment

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Introduction

Radiotherapy (RT) is an effective treatment for childhood brain cancer, but often causes long-term side effects decades later. Identifying patterns of normative growth for brain anatomy would enable RT-related toxicity analysis. Historically, this has been modelled using small datasets and with simplified measures. In this study, we develop a population-based model of normative brain growth using automated tools, providing a baseline to quantify normal growth and variation in healthy children, discriminating by sex.

Methods

734 T1-weighted MRIs of children aged 3-21 were obtained from the PING (Paediatric Imaging, Neurocognition, and Genetics) dataset [2]. The machine-learning segmentation tool FastSurfer [1] was used to split the brain into 20 structures. Outlier segmentations were visually checked. Structural changes with age were analysed using fractional volume (structure volume/brain volume). For analysis, children were grouped by sex (49% female, 51% male). We report the results of linear regressions (slope and intercept), and their measure of correlation (r).

Results

FastSurfer segmentations were determined to be accurate. Significant linear change (males: $|r| > 0.135$; females: $|r| > 0.139$; $p = 0.01$) with age was seen in 17 and 15 structures for females and males, respectively. Table 1 displays the linear fit results for all 20 structures, and Figure 1 shows example structures.

Conclusion

Here, we describe a detailed population-based model of the growing brain using MRI. Not all structures followed a linear pattern of change, with some displaying no change with age. These models will guide future intra-patient assessment and aid study of RT-related toxicity.

Structure	Female			Male		
	Gradient [%/year]	Intercept [%]	r	Gradient [%/year]	Intercept [%]	r
Cerebral cortex*	−0.53	52	−0.88	−0.51	51	−0.86
Cerebral white matter*	0.42	30	0.82	0.4	31	0.80
Brain stem	0.025	1.3	0.73	0.025	1.3	0.72
Ventral diencephalon*	0.0081	0.60	0.71	0.0082	0.59	0.70
Cerebellum white matter*	0.027	2.0	0.58	0.018	2.1	0.43
Pallidum*	0.0027	0.31	0.50	0.0027	0.30	0.48
Choroid plexus*	0.002	0.056	0.40	0.0026	0.050	0.44
Thalamus proper*	0.0058	1.3	0.38	0.0066	1.2	0.41
Amygdala*	0.0015	0.27	0.32	0.0023	0.26	0.40
Hippocampus*	0.0031	0.68	0.29	0.0033	0.66	0.30
Lateral ventricle*	0.022	0.52	0.28	0.029	0.50	0.30
3rd ventricle	0.00082	0.052	0.28	0.00064	0.055	0.20
4th ventricle	0.0018	0.11	0.25	0.0022	0.11	0.26
Inferior lateral ventricles*	0.0006	0.035	0.16	0.0007	0.036	0.17
White matter hypointensities	−0.001	0.10	−0.16	−	−	0.014
Cerebrospinal fluid	0.00044	0.073	0.15	0.0006	0.068	0.19
Accumbens area*	−0.00038	0.12	−0.14	−	−	−0.079
Putamen*	−	−	0.074	−	−	0.087
Cerebellum cortex*	−	−	0.036	−	−	0.030
Caudate*	−	−	−0.0023	−	−	0.022

Table 1: Gradients, intercepts and r values from plots of each structure's fractional volume against age, split by sex. The table is sorted by |r| value of the female brains, and statistically significant values of |r| are in bold. Gradients and intercepts are left blank if no significant trend was found. Structures labelled with a * represent two lateral structures which have been combined.
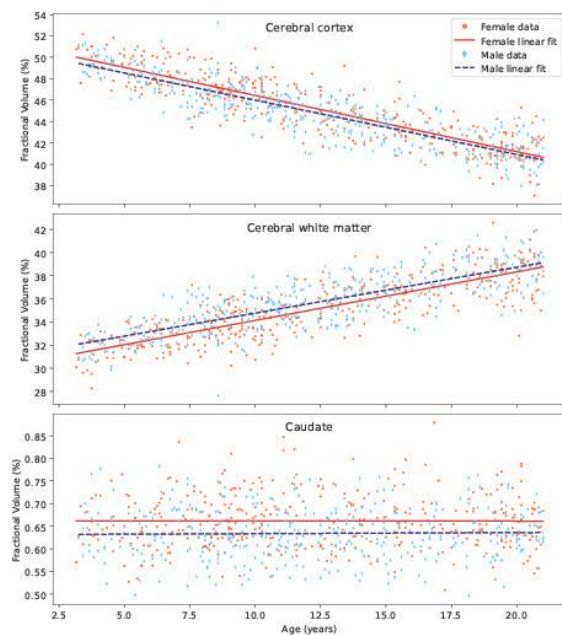
Figure 1: Three example linear fits of fractional volume against age, with gradients, intercepts and r values seen in Table 1. The legend and x axis are shared across the plots. The cerebral cortex and cerebral white matter show strong linear trends while the caudate depicts no significant change with age.

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