

OP 01

Aquaporin-4 Status in Suspected Neuromyelitis Optica and Multiple Sclerosis Spectrum Disorder: An Audit of Serum Analysis by Standard ELISA-Based Method

Gunasena HR¹, Rajamanthre PS¹, Sominanda HMA²

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya, Sri Lanka,

²Department of Basic Medical Science, College of Medicine, QU Health, Qatar University, Qatar

Introduction and Objective

Aquaporin-4 (AQP4) antibodies are an established biomarker for diagnostic confirmation of neuromyelitis optica (NMO) and also important in distinguishing neuromyelitis optica spectrum disorder (NMOSD) from multiple sclerosis spectrum disorders (MSSOD), and other demyelinating diseases. This study audited the use of a standard Enzyme Linked Immunosorbent Assay (ELISA) for detecting AQP4 antibodies in serum.

Methods

A retrospective audit was conducted on serum samples received between 2015 and 2016 at the Department of Anatomy, Faculty of Medicine, University of Peradeniya, from the National Hospitals of Kandy and Teaching Hospital Peradeniya. A validated commercial AQP4-ELISA kit with reportedly high sensitivity (77%) and specificity (99%) was employed. Demographic data (age, gender, geographic origin) and ELISA results were analyzed; clinical details were excluded due to inconsistent documentation. All assays were performed in duplicate, with full repeats when required.

Results

Forty-eight samples, referred for confirmation of AQP4 positivity in clinical NMO and for verification of suspected borderline cases between NMOSD and MSSOD, were analyzed. Females accounted for 48% (n = 23), while gender information was unavailable in 14 cases. Most referrals originated from the National Hospital Kandy, particularly from the Central Province. Of the 48 samples, only one tested positive for AQP4 antibodies.

Conclusion

ELISA-based AQP4-IgG assay demonstrated a low yield at our lab setting despite the meticulous application of the manufacturer's protocol. Although suitable as an initial screening tool, patients with strong clinical suspicion and negative ELISA results should undergo testing with more sensitive cell-based assays. The very low rate of antibody positivity highlights the need for careful clinical and radiological assessment prior to requesting costly antibody testing.

Proof-of-Principle of NF1 Gene Therapy in Plexiform Neurofibroma Mice Models

HewaBostanthirige D^{1,7}, Plante C¹, Vatasescu J P S¹, Lévesque M¹, Poirier C¹, Deschenes M², Chabot B^{2,4,5}, Laurent B^{1, 6}, Geha S^{3,4,5}, Brosseau J P^{1,4,5}

¹Université de Sherbrooke, Faculté de médecine et des sciences de la santé, Département de Biochimie et Génomique Fonctionnelle

²Département de Microbiologie et d'Infectiologie

³Département de pathologie, ⁴Centre de recherche du centre hospitalier universitaire de Sherbrooke (CRCHUS)

⁵Institut de recherche sur le cancer de l'université de Sherbrooke (IRCUS)

⁶Centre de recherche sur le vieillissement (CdrV,

⁷Rajarata University of Sri Lanka, Faculty of Medicine and Allied Sciences, Département of Anatomy

Introduction and objectives

Neurofibromatosis type I is a rare neurocutaneous syndrome characterized by the development of disfiguring neurofibroma tumors with unmet clinical needs. As Neurofibromatosis Type I is a monogenic disease, the development of gene therapy is highly attractive, but it is currently unknown if rescuing the NF1 gene in established neurofibroma is sufficient for tumor regression. The main objective was to demonstrate the conceptual feasibility of NF1 gene therapy in novel pNF mouse models with reversible NF1 expression.

Method

We build two novel NF1 xenograft mouse models with reversible NF1 expression. In the first model, the human NF1 -/- Schwann cells, ipNF95.11b, were genetically modified with a doxycycline-inducible full-length mouse Nf1 gene (ipNF95.11b-TetOne-Nf1 cells). In the second model, the human NF1 +/- Schwann cells, ipNF95.11c, were genetically modified with a doxycycline-inducible potent shRNA against the NF1 mRNA transcript.

Results

In the first model, one month after ipNF95.11b-TetOne-Nf1 cells implantation (time to develop pNF) in the sciatic nerve, mice were split into two groups with doxycycline drinking to induce Nf1 and water drinking as control. Strikingly, all sciatic nerves from mice allowed to drink doxycycline water for one month displayed complete normalization of the sciatic nerve histologically (n=6 sciatic nerves) whereas 83% (5 out of 6 sciatic nerves) developed or maintained a neurofibroma when drinking regular water. In the second model, 24h after implantation of ipNF95.11c-TetON-shNF1 cells, mice were allowed to drink doxycycline to allow NF1 knockdown. Strikingly, doxycycline withdrawal after neurofibroma establishment allowed complete normalization (n=4 sciatic nerves), whereas all sciatic nerves showed evidence of neurofibroma when kept on doxycycline (n=4 sciatic nerves).

Conclusion

We have proof-of-principle of NF1 Gene Therapy in plexiform neurofibroma mice models, providing experimental evidence supporting the development of a NF1 gene therapy solution for patients with neurofibromatosis type 1.

Expression of Metalloproteinases in Atherosclerotic Plaques in Diabetic and Non-diabetic Patients

Logehan C¹, Sahishnavi B¹, Savosh VV²

¹Belarusian State Medical University, Belarus,

²Pathological Anatomy, Belarusian State Medical University, Belarus

Introduction

MMP-1, MMP-2, α -SMA, and CD68 are linked to weaker plaques that can break more easily. These proteins play a role in breaking down plaque and may increase the risk of thrombosis. Therefore the main aim of this study was to analyse the variation of distribution of the morphological and immunohistochemical changes in the coronary vessels with atherosclerotic plaque in diabetic and non-diabetic patients.

Methods

Coronary artery atherosclerotic plaque samples from 20 deceased diabetic and non-diabetic patients were analysed using immunohistochemical staining, for the presence of CD68, MMP-1, MMP-9, and α -SMA. Patient data was collected from the cardiology departments. The corresponding stained pathological slides, used for immunohistochemical analysis, were obtained from the Pathological Anatomical Bureau of Minsk. This allowed for the correlation of clinical information with pathological findings. Quantitative analysis of expression was performed using the programme Aperio Image Scope 12.4.6 and calculation of the ratio of positive markers to the total number of markers present, thereby determining the overall positivity for each marker.

Results

This study examined marker levels (α -SMA, CD68, MMP-1, MMP-9) in atherosclerotic plaques from 20 patients (62-97 years, median 77). Type 2 diabetics (n=17) showed α -SMA (0.24-0.83, mean 0.53 ± 0.15), CD68 (0.21-0.60, mean 0.43 ± 0.12), MMP-1 (0.41-0.65, mean 0.52 ± 0.09), and MMP-9 (0.54-0.83, mean 0.66 ± 0.10). The single Type 1 diabetic had intermediate levels. Non-diabetics (n=2) had higher marker levels. Patients with myocardial infarction (MI, n=5) had higher α -SMA (0.32-0.88, mean 0.60 ± 0.22) and MMP-9 (p=0.03). Although α -SMA and CD68 showed overlap, elevated MMP-9 strongly correlated with MI, suggesting it's a better indicator of plaque vulnerability than α -SMA or CD68 alone.

Conclusion

Significant expression of metalloproteinases (MMP-1 and MMP-9) results in more active degradation of extracellular matrix components, increases a risk of rupture of atherosclerotic plaques fibrous cover and makes them less stable.

A Novel Chemical Solution to Dissolve Blood Clots in Formalin Fixed Specimens to Clear Vascular Lumen Prior to Endovascular Resin Casting

Senevirathne SPNW¹, Arthy J¹, Haakim AWM¹, Edirisinghe EAST^{2*}, Dissanayeke PH², Jayaweera PM³, Weerasekara MM⁴, Yasawardene SG²

¹Department of Medical Laboratory Sciences, Faculty of Allied Health Sciences, University of Sri Jayewardenepura

²Department of Anatomy, Faculty of Medical Sciences, University of Sri Jayewardenepura

³Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura

⁴Department of Microbiology, Faculty of Medical Sciences, University of Sri Jayewardenepura

Introduction

Vascular resin casting is a tissue plastination technique where a liquid resin is injected into the vascular system to demonstrate the vascular network and its distribution. Presence of postmortem formalin-fixed clots within vessels is a major challenge leading to incomplete casting. Commercially available clot-dissolving solutions are costly. This study aimed to investigate a novel chemical solution to dissolve formalin-fixed postmortem clots without damaging vessels.

Method

The clot-dissolving ability of four chemicals known for fibrinolytic properties: Hydrogen Peroxide (H₂O₂), Urea, Sodium Dodecyl Sulfate (SDS) and Ammonium Hydroxide (NH₄OH), was assessed at three concentrations, with distilled water as a control. The most effective chemical combinations were tested for clot-dissolving ability at room temperature and 05⁰C using formalin-preserved Aorta, IVC and lung. Tissues were assessed for tissue damage by microscopy and compared with controls. The selected combination was injected into the vascular system of a cadaveric lung, sliced into cross sections and observed macroscopically for clot dissolution.

Results

Disintegrated clot particles increased in both concentration and incubation time dependent manner for all 4 chemicals. H₂O₂ showed a rapid and maximum dissolution initially, but was limited to 1-2 hours. Other three chemicals did not show a notable reduction in clot size. Combination of 10ml of 35% NH₄OH, 1g of NaBH₄ and 2g of SDS showed a maximum clot dissolution after 24 hours at room temperature and at 05⁰C. Acidic combination did not show a disintegration. Selected combination showed minimal tissue damage (intact tunica intima) compared to controls microscopically. No remaining postmortem clots were observed macroscopically in the pulmonary vessels in the cross sections of the lung.

Conclusions

The studied combination was the most effective for dissolving formalin-fixed postmortem clots with minimal tissue damage and ex vivo clot-dissolving activity.

Development of a Less Health Hazardous Chemical Medium for Tissue Preservation Compared to Traditional Formalin Solution

Pathirage TN¹, Weerawardhana WPGK¹, Ahamed MSZ¹, Edirisinghe EAST², Dissanayeke PH², Weerasekara MM³, Jayaweera PM⁴, Yasawardene SG²

¹Department of Medical Laboratory Sciences, Faculty of Allied Health Sciences, University of Sri Jayewardenepura

²Department of Anatomy, Faculty of Medical Sciences, University of Sri Jayewardenepura

³Department of Microbiology, Faculty of Medical Sciences, University of Sri Jayewardenepura

⁴Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura

Introduction and Objectives

Tissue preservation is a technique used to prevent tissue decomposition, and is vital in histology-based diagnosis and cadaver-based teaching. Currently formalin is widely accepted and commonly used, but has harmful health effects. Objective of this study was to investigate a less health hazardous tissue preservative chemical medium compared to the existing formalin method.

Methods

A series of preservative media were developed using alcohols, salts, disinfectants and additives. Chemicals were tested individually and in combination. Fresh bovine skeletal muscle samples (2cm³ size) were preserved and evaluated after one week. Chemicals resulting in tissue decomposition were removed. Two preservative media were finalized at the end of the second phase. Stability of these were evaluated by assessing preservation over a period of three weeks. Preservation potential was evaluated macroscopically and microscopically using formalin (10%) and Crosado as controls. Color, odor, consistency and shrinkage were assessed. Hematoxylin and Eosin stained tissue slides assessed cell morphology. Selected media were injected to Mozambique tilapia (*Oreochromis mossambicus*) for assessing internal tissue preservation.

Results

Medium-01: ethanol (95%), phenoxyethanol, sodium chloride, distilled water, and preservative medium-02: ethanol (95%), sodium nitrate, sodium carbonate, sodium chloride, thymol and distilled water exhibited optimal macroscopic and microscopic preservation. Both had alcoholic odour in contrast to the pungent odour of formalin. Consistency and shrinkage tissues were similar to controls. Medium-01 had retained the brown coloration of tissue and medium-02 displayed darkening. Histological findings were similar to controls with good nuclear and cytoplasmic morphology. Both media had preserved the fish without any noticeable odour or decomposition. Internal organs were clearly visible in medium-01, whereas medium-02 displayed tissue darkening.

Conclusion

Two preservative media with reduced toxicity despite their relatively high preparation cost compared to formalin were developed. Tissue darkening and poor penetration ability were identified as drawbacks of medium 02 compared to medium 01. Further optimization is essential before their utilization in cadavers.

OP 06

Deceased Donor Bone Extractions and Preservation Techniques: A Scoping Review

Jayasena AKOM^{1*}, Sampath TASB¹, Jinadasa PPDN¹, Jayapala KTDDP¹, Wimalasundera AR¹

¹Department of Anatomy, Faculty of Medicine, University of Moratuwa, Moratuwa, Sri Lanka

Introduction

Human bones are the cornerstone of anatomy education, offering unique and real morphological details compared to synthetic models. Numerous techniques are available but evidence-based guidelines to ensure the optimal quality are not available. This scoping review aims to identify and compare the techniques of bone preparation, to target towards an optimized protocol.

Methods

This review followed the PRISMA-ScR (2020) guidelines. A systematic search of PubMed and Google Scholar was conducted in 2024. Inclusion criteria consisted of original studies describing the human bone preparation methods. Articles that were not in the English language, studies involving non-human or infant bones, and studies on DNA, proteome, or soft tissue preservation outcomes were excluded. Extraction table consisted of : methodology, time, cost, advantages, disadvantages, effectiveness, and qualities of bones of each method.

Results

29 articles fulfilled inclusion criteria from 6621 PubMed and 31 Google Scholar. Methods included burial, cold and hot water maceration, detergent and enzymatic maceration, bleaching with hydrogen peroxide (H₂O₂), boiling with potassium hydroxide, insect defleshing, and microwave or oven maceration. Burial was commonest (27.5%, n=8) though inexpensive took longer time (6 months - 2 years), modified by soil type, climate, and burial depth, yielding fragile or discoloured bones. H₂O₂ was effective within 24 hours in 10-16% ,higher concentration or longer duration caused brittleness and erosion. Detergent-based maceration, with enzymatic additives and moderate heat, gave rapid results, but with discoloration. Enzymes accelerated maceration, but with microhardness. Insect maceration gave precise cleaning, but maintenance was resource-consuming. Cold water maceration was gentler but prolonged, while hot water was faster but with shrinkage and erosion. Microwave and oven maceration was restricted to bone size and equipment availability. Long-term durability, microscopic structural damage was evaluated only in 5 studies.

Conclusion

This review brings together the diversity of bone preparation methods, with their specific strengths and weaknesses. Establishing cost-effective yet high-quality maceration protocols remain the priority.

Developing a Visual Grading Scale for Determining the Optimal Exposure Duration of 15% Hydrogen Peroxide in Bone Bleaching and Maceration : A Proposed Methodology

Sampath TASB¹, Jinadasa PPDN^{1*}, Perera RNH¹, Wimalasundera AR¹, Jayapala KTDDP¹

¹Department of Anatomy, Faculty of Medicine, University of Moratuwa, Moratuwa, Sri Lanka

Introduction and Objectives

Hydrogen Peroxide (H₂O₂) is a popular chemical used in bone bleaching and maceration. Here we propose a method to design a Visual Grading Scale (VGS) and then develop a mathematical formula to determine the optimal exposure duration of H₂O₂ for bone maceration and bleaching.

Methods

Study will consist of 2 steps: manual defleshed ribs - 75% bone exposed. 2 sets of 6 ribs will be immersed in 15% H₂O₂ for time intervals of 3 hours. They will be photographed against a black background at each interval. A VGS will be developed based on 3 criteria as surface whitening, bubbling in H₂O₂, and brittleness. Repeated with time interval of 1 hour to 30 minutes until visual targets of best exposure and initial signs of over exposure are determined. In second step, the VGS will be used to determine a uniformed endpoint of maceration and bleaching times for different bone categories. Bone characteristics will be collected defleshing status: fully, 75%, 50%, 25% covered, cleaned, pre-defined dimensions that are required to get a rough value for the surface area of the bone. Multiple linear regression models will be used to give a mathematical association of these data.

Results

A 5-point VGS will be developed, to identify the end point for bone maceration and bleaching process. Time for optimal maceration will be measured experimentally with VGS for different bone categories. 3D scatter charts for each bone category will be plotted using statistical software, with time on the x-axis, bone surface area (rough value) on the y-axis, and the initial defleshing score on the z-axis. The associations will be represented with multiple linear regression models to forecast the time based on y and z axis data in each bone type: Predicted time for maceration = $\beta_0 + \beta_1(\text{Bone surface area}) + \beta_2(\text{Initial Defleshing Score})$. Here, β_0 is the intercept, while β_1 and β_2 are coefficients for each independent variable, which will be calculated using statistical software.

Conclusion: These findings will guide the determination of appropriate H₂O₂ exposure times for optimal bone preservation during the pre-exposure setup. This minimizes the need for repeated handling during procedure and reduces the risk of bone brittleness.

Point of Entry of the Spinal Accessory Nerve in the Posterior Triangle of the Neck: A Review of Anatomical Variations and Clinical Relevance

Dissanayaka DWVN¹, Sandaruwan WMAS¹, Kosgallana EW², Liyanapathirana LD¹, Samaranayaka KI¹, Dias DK¹

¹Oral and Maxillofacial Surgery Unit, National Hospital Galle,

²Department of Anatomy, Faculty of Medicine, University of Peradeniya

Introduction and Objectives

Spinal accessory nerve (SAN) is at risk of iatrogenic injury during surgical procedures in the posterior triangle of the neck, leading to significant morbidity. Precise anatomical knowledge and reliable intraoperative landmarks are essential to prevent iatrogenic nerve damage. Objective of this study was to systematically review anatomical, clinical, and imaging studies describing the entry point of the SAN into the posterior triangle and its relationship to key surgical landmarks, with emphasis on clinical implications for surgical safety and training.

Methods

A systematic search was conducted in PubMed and Semantic Scholar (cut-off date: 05.2025). Search targeted anatomical, clinical, surgical literature on SAN entry point, anatomical variations on cadaveric studies, and imaging. Following PRISMA guidelines, a total of 1006 publications were identified; 276 were screened, 175 met eligibility criteria, 50 were included. 18/50 studies provided data on SAN entry point; whereas only 11 reported distances from anatomical landmarks and were included in pooled analysis, 7 were excluded due to qualitative reporting.

Results

Most studies confirmed the classical description of SAN entry at the junction of the upper and middle third of the SCM's posterior border, but significant variability was observed across individuals and populations. Mean SAN entry point was located 0.33–0.36 along the posterior border of the SCM from mastoid process, with differences by sex, height, and ethnicity. Distances were consistently reported as 0.9–1.5 cm superior to Erb's point and 4–7 cm inferior to mastoid process. Relationship between the SAN and the great auricular nerve ("X-pointer") was identified as a reliable landmark. Ultrasound, demonstrated high accuracy in preoperative mapping and intraoperative nerve identification.

Conclusion

Significant variability exists in the SAN entry point into the posterior triangle, challenging surgeons' confidence in nerve preservation depending merely on surgical anatomy. Reliable intraoperative landmarks and preoperative imaging, particularly ultrasound, are essential for minimizing iatrogenic injury.

Common Bile Duct Morphometry – An Imaging Study

Jayarathna MJS¹, Udupihille J², Amaratunga HA¹

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya,

²Department of Radiology, Faculty of Medicine, University of Peradeniya

Introduction and Objectives

Common bile duct (CBD), formed by the union of cystic duct and common hepatic duct has a reported diameter of around 6 mm (<8 mm), and length of 60 – 80 mm. Normal ranges help differentiate between jaundice of obstructive or non-obstructive causes and age-related dilatation. Objective of this study was to morphometrically analyse CBD in magnetic resonance cholangiopancreatography (MRCP) images in a Sri Lankan cohort.

Methods

Study was conducted at the Faculty of Medicine, University of Peradeniya, and Suwasewana Hospitals. MRCP images were retrieved from the image library. Age, sex, and ethnicity of patients were recorded. Standard measurement techniques and an electronic calliper present in the RadiAnt-DICOM viewer were used to measure length and internal diameter of CBD in millimetres. Widest diameter of CBD was taken, perpendicularly to its long axis. Distance between point of commencement and the point of joining the CBD with pancreatic duct was measured. Descriptive analysis and Student t-test were used to compare the length and diameters of CBD between males and females.

Results

Thirty MRCP images were retrieved. Two were excluded due to dilated CBD. From the remaining 28, 53.6% were male patients, the majority being Sinhalese (86.66%). Mean age of the sample was 53.4 ± 16.8 years (range 28 - 86). Mean diameter of the CBD was 6.39mm (range 3.1-10.8). Mean length of the CBD was 46.4 mm (range 18.1-87.5). Student t-test detected a statistically significant difference in the CBD length between males and females ($p = 0.029$).

Conclusions

Average CBD diameter in a Sri Lankan adult is 6.39 mm with an upper limit of 10.8 mm, which is similar to the values reported in literature, although there were studies with a higher upper limit. Average CBD length is 46.4 mm, which coincides with some reported literature but is lower than others. Males had a higher mean diameter and length.

Variations of the Umbilical Fissure of the Human Liver

Jayarathna MJS¹, Ekanayake EMKB², Wickramasinghe CU², Vadysinghe AN², Udupihille J³, Amaratunga HA¹

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya

²Department of Forensic Medicine, Faculty of Medicine, University of Peradeniya

³Department of Radiology, Faculty of Medicine, University of Peradeniya

Introduction and objectives

Umbilical fissure is a long, narrow groove that carries ligamentum teres hepatis in the liver. Variants reported include a bridge of liver parenchyma or a fibrous tissue band, making a tunnel in which the ligamentum teres travels. Since it is important to be familiar with such common variations during clinical practice, we aim to evaluate the variations of the umbilical fissure in a sample of Sri Lankan cadavers.

Methods

Study was conducted at the Departments of Anatomy and Forensic Medicine, Faculty of Medicine, University of Peradeniya. Formalin-fixed cadaveric liver samples, and postmortem liver specimens, were assessed by the classification described by Cawich et al. (2021). Age, sex, and ethnicity when available, were collected. Descriptive data were analyzed with IBM SPSS Statistics v26 software.

Results

20 cadaveric and 101 postmortem specimens, with a mean age of 61.6 years (SD±19.9, range 2–95 years) were assessed. Slight male preponderance was observed (57% male and 43% female), with a Sinhalese majority (87.6%). Cawich, Type I (normal anatomy, long and deep groove at the umbilical fissure) was seen in 42.1%, Type II (fibrotic band across the umbilical fissure without being covered by hepatic parenchyma) in 35.5%, Type III (incomplete covering of umbilical fissure by projections of liver parenchyma from the lateral walls) in 6.6% and Type IV (complete covering of umbilical fissure by a bridge of hepatic parenchyma) in 15.7%. There is a statistically significant, small-to-moderate association between sex and ligament type ($\chi^2(3)=8.08$, $p=0.044$; Cramer's $V=0.258$).

Conclusions

Prevalence of Type I, normal anatomy was similar to that of India. Types II, III and IV were higher than reported. Type II was commoner in females, while Types III and IV were predominant in males. Although there is a statistically significant association between sex, the linear-by-linear association was not significant, suggesting that the relationship is not a simple linear trend across the types.

OP 11

Cadaveric Assessment of Palmaris Longus Variations in the Sri Lankan Population

Dissanayake S¹, Perera ST¹, Kumarasinghe WAAM¹, Abeysiriwardana PS¹, Perera MDMR¹

¹Faculty of Medical Sciences. University of Sri Jayewardenepura

Introduction

Palmaris longus is one of the most variable muscles of the human body. Its role in forearm function is minor, yet it holds considerable clinical importance. The tendon is frequently harvested for grafting in reconstructive procedures because it is long, accessible, and can be removed without producing noticeable loss of strength or function. Variations in its structure such as complete absence, bifurcated tendons, doubled bellies, reversed arrangements, or unusual insertions may complicate its usefulness in surgery and influence outcomes.

Methods

The study was carried out at the Department of Anatomy, Faculty of Medical Sciences, University of Sri Jayewardenepura. A total of 30 upper limbs obtained from 15 formalin-preserved cadavers, comprising 11 males and 4 females donated for teaching and research, were examined. The anterior compartment of each forearm was carefully dissected to trace the palmaris longus from its origin at the medial epicondyle of the humerus to its insertion into the palmar aponeurosis. All findings were independently observed and documented by 2 investigators in order to ensure accuracy and reduce the possibility of observer bias.

Results

Of the 30 upper limbs studied, 27 demonstrated the presence of the palmaris longus, giving a prevalence of 90%. The muscle was absent in 3 specimens (10%), and all cases of absence occurred in male cadavers. Two were found on the right side and 1 on the left. In addition, 3 male specimens showed morphological variations, representing 10% of the total. These variations included 1 bifurcated distal tendon, 1 partially doubled muscle belly, and 1 tendon–muscle–tendon configuration. The remaining 24 specimens (80%), which included all female cadavers, displayed the classical pattern without any notable deviations.

Conclusion

10% absence observed is lower than the global pooled prevalence of about 20%, though within the broad international range of 1.5–63%. Variants included a bifurcated tendon, a doubled belly, and a tendon–muscle–tendon arrangement, underscoring the muscle's morphological diversity.

Variations in the Exit and Bifurcation of the Sciatic Nerve: Findings from Cadaveric Dissection

Dissanayake S¹, Perera ST¹, Kumarasinghe WAAM¹, Abeysiriwardana PS¹, Perera MDMR¹

¹Faculty of Medical Sciences, University of Sri Jayewardenepura

Introduction and Objectives

The sciatic nerve is the largest peripheral nerve in the human body and provides both motor and sensory supply to much of the lower limb. While its general course is well recognized, anatomical variations are frequently observed, particularly in the gluteal region as the nerve passes in relation to the piriformis muscle. The present study aimed to describe the course of the sciatic nerve in relation to the piriformis muscle, to identify the level of its division, and to record the distance from the ischial tuberosity to the bifurcation point.

Methods

Study conducted at Department of Anatomy, Faculty of Medical Sciences, using 34 lower limbs obtained from 17 formalin-fixed cadavers (9 male, 8 female). Dissection was performed by reflecting the gluteus maximus muscle to expose the underlying piriformis and the course of the sciatic nerve along its length. Measurements were obtained by placing a standard tape measure from the ischial tuberosity to the point of bifurcation. All findings were recorded independently by two investigators to minimize bias and improve reliability of the data.

Results

33 (97.1%) showed the sciatic nerve emerging below the piriformis muscle, while 1 (2.9%), passed between fascicles of the piriformis. Mean distance from the ischial tuberosity to the bifurcation was 26.38 cm $\pm$ 9.29 cm. Division was most frequently observed in the popliteal fossa (20 limbs, average distance 29.54 $\pm$ 3.54 cm. Four limbs showed division in the lower third of the thigh (28.18 $\pm$ 3.78 cm), and in 2 limbs it divided in the middle third (23.10 $\pm$ 6.62 cm). In 3 limbs, bifurcation occurred in the upper thigh (8.83 $\pm$ 2.13 cm). Two limbs showed a high division within the gluteal region itself at 2.95 $\pm$ 0.64 cm). Additionally, in 3 specimens the sciatic nerve divided even before exiting the pelvis.

Conclusion

The sciatic nerve exited below the piriformis muscle in a majority of cases, which is a higher prevalence of the typical course compared with the global average. The study also confirmed considerable variability in the level of bifurcation, ranging from the pelvis to the popliteal fossa.

OP 13

Distribution Pattern of Coronary Arteries: A Cadaveric Study

Dissanayake JK¹, Fernando RSR¹, Wijeratne AGG¹, Lansakara MN²

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya, Sri Lanka,

²Cardiothoracic Unit, National Hospital, Kandy, Sri Lanka

Introduction and Objectives

Coronary arteries differ significantly between individuals, affecting interventional procedures, and imaging diagnostics. Recognizing common patterns and variations, is vital for clinical decision making. This study aimed to describe the distribution patterns of the coronary arterial system and variations.

Methods

A total of fourteen formalin preserved hearts were studied through dissection and visual examination. The origins of the left and right coronary arteries (LCA, RCA), left main coronary artery (LMCA) branching, LAD and circumflex (Cx) features, presence of ramus intermedius (RI), RCA path and branches, posterior descending artery (PDA) origin and count, myocardial bridges, diagonal branch patterns, ostial characteristics, and signs of atherosclerosis were studied and documented.

Results

LCA originated 1 cm above the aortic root in 10 hearts (71.4%), while in 4 hearts (28.6%) it was at 0.5 cm. The LMCA split into LAD and Cx in 11 hearts (78.6%), while 3 hearts (21.4%) had a trifurcation including a ramus intermedius. A dual or accessory LAD was found in 2 hearts (14.3%) specifically two LADs from LCA and one LAD from each coronary artery. Myocardial bridges were seen in 6 hearts (42.9%), mostly over the LAD (5 cases), with one over a marginal branch. Right dominance occurred in 11 hearts (78.6%), left dominance in 1 and co-dominance in 2. Multiple PDAs were seen in 4 hearts (28.6%). The infundibular branch came from the RCA in 5 cases (35.7%). Diagonal branches were present in all hearts, with 2 variations: apical extension and origin before the main LAD. Atherosclerotic plaques or calcifications were found in 10 hearts (71.4%), near the aortic root or ostia. Ostial narrowing and calcification was seen in 4 hearts (28.6%).

Conclusions

Frequent presence of myocardial bridges (42.9%) and atherosclerotic changes (71.4%) improving anatomical knowledge and supporting safer management of cardiac issues.

OP 14

Variant Anatomy of the Papillary Muscles of the Human Heart

Shastakovich KM¹, Pratheepkumar V¹, Mohamed NN¹

¹Department of Normal Anatomy, Belarusian State Medical University, Minsk

Introduction and Objectives

Papillary muscles are pivotal structures within the heart, particularly influencing the function of the atrioventricular valves. Objective was to evaluate the anatomical variations of the papillary muscles in the human heart.

Methods

Fifty human hearts obtained from cadaveric specimens at Normal Anatomy Department BSMU, Minsk, were dissected. Digital calipers, measuring tapes, and protractors were employed to take measurements (length, width, and distance from key landmarks), and classification of papillary muscle patterns based on their number, size, and arrangement within the ventricles

Results

Number was consistent with standard literature with variations in shape. Anterior and posterior papillary muscles were longer in the left ventricle compared to the right ($p < 0.001$) - (anterior - 15.2 mm in left ventricle and 9.8 mm in right; posterior papillary muscle measured 14.7 mm in the left ventricle and 9.4 mm in the right). In contrast, the widths of these muscles showed no significant variation (average widths of 4.5 mm and 4.3 mm). Septal papillary muscle was consistently conical and uniform across all specimens. Classification patterns such as Single Base Divided Apex (SBDA)38, Base Attached to a Large Bridge (BL)5, Long Papillary (LP)3, Perforated Papillary (PP)2, and Single Base Fused Apex (SBFA)2 were identified, with SBDA being the most common pattern in both ventricles. No septal pattern was observed in anterior papillary muscles.

Conclusions

The study highlights the anatomical variability of papillary muscles in the human heart, with consistent standard configurations but notable morphological differences that may influence surgical and clinical outcomes. Recognizing these variations is crucial for accurate diagnosis and effective surgical interventions

Morphological Characteristics of Cardiomyocytes in Normal Versus Hypertrophic Conditions

Pratheepkumar V¹, Chandrakumar L², Baraneetharan S²

¹Department of Histology, Cytology, Embryology, Belarusian State Medical University, Minsk,

²Department of Pathological Anatomy, Belarusian State Medical University, Minsk

Introduction and Objectives

Cardiovascular diseases remain a leading cause of mortality worldwide, accounting for approximately one-third of all deaths according to WHO data 2024. Investigating the cellular architecture of cardiomyocytes (CMCs) in both healthy and diseased states, alongside understanding the factors that hinder their regenerative capacity, holds promise for developing future therapeutic strategies aimed at heart tissue repair. This research aims to analyze the origin and structural features of cardiomyocytes under normal physiological conditions and during cardiac hypertrophy.

Methods

A total of 15 histological sections stained with haematoxylin and eosin were obtained from the Department of Pathological Anatomy at Belarusian State Medical University. These samples were digitized, and the cellular components were evaluated and quantified using the ImageScope software.

Results

CMCs between healthy (n=7) and hypertrophic (n=8) tissues were assessed. Average nuclear diameter in normal CMCs was 12.87 μm , whereas hypertrophic cells exhibited a significantly larger average of 32.21 μm ($t = 16.05$, $p < 0.001$). The length of intercalated discs measured 9.8 μm in normal cells and extended to 23.91 μm in hypertrophic cells ($t = 10.73$, $p < 0.001$). Cell width was 13.91 μm in healthy tissue compared to 33.66 μm in hypertrophied myocardium ($t = 16.52$, $p < 0.001$).

Conclusions

These findings indicate that hypertrophic cardiomyocytes undergo significant enlargement in nuclear size, intercalated disc length, and overall cell width. Quantitatively, the nuclear size in hypertrophic tissue was approximately 2.5 times larger than in healthy tissue, with a similar proportional increase observed in cell width.

Coexistence of Dual Hila, Double Renal Arteries, and Incomplete Ureteric Duplication in a Single Kidney: A Cadaveric Case Report

Gunasekara PGMU¹, Wijerathna BARP¹, Balasooriya CH¹, Malshani GWW¹, Kolambage YD¹, Weerakoon TCS¹, Perera J¹

¹Department of Anatomy, Faculty of Medicine, Sabaragamuwa University of Sri Lanka

Introduction

Variants of renal vessels and the collecting system are individually common, yet their coexistence in a single kidney is exceptionally rare. We aimed to document, map, and interpret a unique combination of two hila, dual vascular pedicles, and an incomplete duplex ureter in a kidney identified during routine cadaveric teaching at the Faculty of Medicine, Sabaragamuwa University of Sri Lanka.

Case Report

Findings were detected in a 60–70-year-old male where, the left kidney had two discrete hila. Kidney was located inferior to its usual position with two independent renal arteries arising from the abdominal aorta at different levels (L1 - divided into anterior and posterior, inferior to the inferior mesenteric artery - no prehilar branching). Renal vein drained into the inferior vena cava at the level of the lower hilum, after receiving two distinct tributaries from the upper and lower hila. The suprarenal and testicular veins joined the renal venous tributary emerging from the upper hilum. Two renal pelvises were identified. The ureter from the upper hilum joined the lower renal pelvis to continue as a single ureter, consistent with an incomplete duplex system. The arrangement of structures from anterior to posterior at the upper hilum was vein–artery–pelvis, whereas at the lower hilum this sequence was reversed. The contralateral kidney had a single hilum and ureter but received a dual arterial supply from the abdominal aorta at the level of L1 and above the inferior mesenteric artery.

Conclusion

To our knowledge, this represents the first published Sri Lankan report describing dual aortic renal arteries at two levels, bifid venous drainage through two hila, and an incomplete duplex ureter. Our findings also support the need for continued anatomical studies to better define the spectrum of renal and ureteric variations in the population.

Hand and foot morphometry and morphologies in Vedda people and present-day Sri Lankans

Chandimal KM¹, Chathumudi PMSJ¹, Priyadarshani KMWW¹, Ihalage WISM¹,
Jayawardhana HASDR², Chandrasekara KDCHM¹, De Alwis LIS¹, Wickramarathna EAAM¹,
Bowatte PGCS³

¹Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka,

²Department of Microbiology, Faculty of Medicine, Wayamba University of Sri Lanka,

³Department of Medicine, Faculty of Medicine, Wayamba University of Sri Lanka

Introduction and Objectives

The Veddas, the indigenous people of Sri Lanka, descend from prehistoric humans of the Mesolithic era. Hand and foot morphology and morphometry provide critical insights into anatomical variations, sexual dimorphism, population differences, and the functional and evolutionary characteristics of humans. The objective of the present study was to assess the hand and foot morphologies and morphometry of the Vedda residing in Dambana Vedda capital, Sri Lanka and to compare them with present-day Sri Lankans.

Methods

A total of 73 (37 females and 36 males) authentic Vedda from Dambana, were recruited, with 73 present-day Sri Lankans as controls. Upper limb measurements; full length, arm, forearm, and hand length, hand breadth, and lengths of five digits, lower limb measurements: full length, thigh, leg and foot length, and foot breadth, were measured on both sides. Hand length and breadth were used to calculate the hand index, classified into five hand phenotypes. Foot length and breadth were used to calculate the foot index. Hand length, hand breadth, foot length and foot breadth were measured using a spreading caliper, and digit lengths with a sliding Vernier caliper. Data were analyzed using SPSS software (version 23.0). Frequencies and mean values of measurements were used to compare Vedda and the present-day Sri Lankans.

Results

In males, most measurements were higher in Sri Lankans. Statistically significant differences ($p < 0.05$) were observed for the majority of measurements. Both groups exhibited mesocheir hand phenotype in the right, while Vedda males showed brachycheir phenotype on the left, contrasting with the mesocheir phenotype in Sri Lankan males. In females, most measurements were higher in Sri Lankans. Significant differences ($p < 0.05$) were observed in the majority of measurements. Both groups exhibited the dolichocheir hand phenotype in both hands. Interestingly, Vedda individuals of both sexes exhibited higher foot breadths and forearm lengths compared to Sri Lankans.

Conclusion This study provides key data on hand and foot morphology in the Vedda and present-day Sri Lankan populations, highlighting distinct anthropometric variations that contribute to the understanding of population-specific morphological diversity.

A Revisit of ABO Blood Group Phenotypes in the Dambana Vedda Population, Sri Lanka

Chandimal KM¹, Jayawardhana HASDR², Priyadarshani KMWW¹, Ihalage WISM¹, Wickramarathna EAAM¹, Bowatte PGCS³

¹Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka

²Department of Microbiology, Faculty of Medicine, Wayamba University of Sri Lanka

³Department of Medicine, Faculty of Medicine, Wayamba University of Sri Lanka

Introduction and Objectives

ABO blood group system is a key genetic marker in population genetics, transfusion medicine, and anthropological studies. This study aimed to determine the prevalence of ABO blood group phenotypes in the present-day Dambana Vedda population, to compare these distributions with present-day Sri Lankans, and to reinterpret historical data from Ellepola and Wikramanayake (1986) to evaluate temporal changes in phenotypic frequencies.

Methods: Eighty adult authentic Veddhas from Dambana were recruited after verification. Capillary blood was aseptically collected by a qualified medical officer using sterile lancets. ABO phenotypes were determined by slide agglutination with commercially available anti-A, anti-B, and anti-D antisera. Present-day Sri Lankans, 160 adults representing all provinces of Sri Lanka (80 females, 80 males) were recruited as controls. Data were analysed with SPSS (version 23) to calculate frequency distribution of blood group phenotypes of present-day Vedda, which were compared with present-day Sri Lankans and historical data (Ellepola & Wikramanayake, 1986)

Results: Among present-day Veddhas, blood group B was the most prevalent (48%), followed by A (24%), O (20%), and AB (8%). In contrast, present-day Sri Lankans showed a different pattern, with O as the most common blood group (46%), followed by B (27%), A (22%), and AB (6%). Statistical analysis revealed that the differences in the prevalence of blood groups B and O between Veddhas and Sri Lankans were significant ($p = 0.002$ for both). Historical data from Ellepola and Wikramanayake (1986) reported B (42.6%), O (40.7%), A (13.0%), and AB (3.7%) among past Vedda population, highlighting temporal changes within Vedda communities over the past four decades.

Conclusions

ABO blood group distribution of the present-day Dambana Vedda population remains distinct from that of the present-day Sri Lankan population. While Blood group O predominates nationally, blood group B continues to be the most common among Veddhas, indicating a unique and persistent genetic profile through the four decades.

Inconsistencies in Medical Refusal Criteria in Body Donation Forms from Sri Lankan Universities: A Comparative Analysis with International Guidelines

Wickramarathna EAAM¹, Wijayasekara MAAE², Chandimal KM¹

¹Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka

²Department of Parasitology, Faculty of Medicine, Wayamba University of Sri Lanka

Introduction and Objectives

Body donation from individuals with certain medical conditions poses infectious risks to handlers or compromises educational utility due to altered anatomy. Besides this, consistent communication of declination reasons is essential for the ethical integrity of body donation programs. This study assessed the consistency and accuracy of medical condition disclosures in the body donation forms issued by Sri Lankan medical and dental faculties.

Methods

A content analysis was conducted on the information sheets accompanying the body donation consent forms from 14 Sri Lankan medical and dental faculties, downloaded from institutional websites. Listed criteria were compared with each other for internal consistency and against international criteria: “Human body donation programs best practices and recommended standards: a task force report” from the American Association for Anatomy (AAA), and the “Good practice for the donation and study of human bodies and tissues for anatomical examination” by the International Federation of Associations of Anatomists (IFAA). Refusal conditions posing infectious risks were compared against “Guidelines for safe work practices in human and animal medical diagnostic laboratories recommendations of a CDC-convened, bio safety blue ribbon panel”, “Guidelines on autopsy practice, precautions for high-risk infectious autopsies” by Royal College of Pathologists (RCP) and the “Infection hazards of human cadavers list” by International Society of Infectious Diseases (ISID). A blinded review process was employed to ensure objectivity and mitigate bias.

Results

Internal inconsistencies were detected with divergence from some guidelines and recommendations set forth by above associations. Hepatitis and HIV were commonly indicated (86% of forms, n=12). This was followed by tuberculosis (50%,n=7), meningitis (36%,n=5), and COVID-19 (21%,n=3). Despite recommendations, none of the forms listed prion diseases as a refusal criterion. Refusal criteria for conditions that compromise anatomical integrity (per IFAA and AAA guidelines) were also variably indicated. Organ donation and extensive surgery were the most common refusal criteria (71%, n=10), followed by cancer (64%, n=09) and trauma (43%,n=06).

Conclusions

This analysis identified inconsistencies and omissions in the medical refusal criteria detailed within Sri Lankan body donation consent forms.

Attitudes of Medical Students Toward Anatomy: A Cross-Sectional Study Across Pre-Clinical and Clinical Phases

Perera RNH¹, Sampath TASB¹, Dewagiri DKAWKSS², Jayapala KTDDP¹,
Wimalasundera AR¹

¹Department of Anatomy, Faculty of Medicine, University of Moratuwa, Sri Lanka.

²Department of Medicine and Mental Health, Faculty of Medicine, University of Moratuwa, Sri Lanka.

Introduction and Objectives

Anatomy is a fundamental subject taught during the pre-clinical phase of medical education. There has been an observable shift in students' perception of anatomy education, with varying opinions on its relevance in clinical studies. This study aims to systematically evaluate and compare students' attitudes toward the clinical relevance of anatomy education between the pre-clinical and clinical phases.

Method

A descriptive cross-sectional study was conducted among second-year students who had completed the pre-clinical phase and fourth-year students who had completed pre-professorial clinical rotations at the Faculty of Medicine, University of Moratuwa. A questionnaire comprising two sections: sociodemographic information and students' perceptions of existing teaching-learning activities, and 20 statements assessing students' attitudes towards the clinical relevance of anatomy education which was developed based on the Thurstone Scale with a predefined scores of 1–11- lower scores favourable attitude. Descriptive statistics were used to summarize the cohort data, and inter-cohort comparisons of mean attitude scores were conducted to identify differences between the two student groups.

Results

The response rate was 73% (n=73) among fourth-year students and 80% (n=80) among second-year students. Of the 153 participants, 47.7% (n=73) were fourth-years and 52.3% (n=80) second-years. Overall, 71.9% (n=110) were female, while 7.2% (n=11) did not disclose gender. Among fourth-years, 72.5% (n=58) were female, compared to 71.2% (n=52) in second-years; 12.5% (n=10) of second-years. Mean ages were 25.8 and 22.8 years, respectively. The mean attitude score toward anatomy was 4.51 (± 0.985 SD) for second-years and 4.15 (± 0.985 SD) for fourth-years. The fourth-year cohort demonstrated a significantly more favourable overall attitude ($p=0.026$) on the Thurstone scale. Results revealed 98.7% (n = 151) of students believed that incorporating relevant clinical scenarios into gross anatomy lectures is useful, while 83.7% (n = 128) felt that teaching clinical anatomy topics/student base learning/case base learning is more beneficial than gross anatomy lectures.

Conclusion

Both study groups demonstrated a favourable attitude toward the clinical relevance of anatomy. However, students with greater clinical exposure (fourth-year students) exhibited a significantly more favourable overall attitude.

Splenic Infarction as an Unusual Cause of Fluctuating Neurological Symptoms: Anatomical Insights

Jayawardana WJBSMS¹, Shantha DWA², Medagama A²

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya, Sri Lanka, ²Professorial Medical Unit, Teaching Hospital Peradeniya, Sri Lanka

Introduction

Corpus callosum is the largest commissure connecting the two cerebral hemispheres, with the posterior thickened segment forming the splenium. Fibers in the splenium interconnect the left and right occipital, temporal and parietal regions. Splenium has a dual blood supply from the anterior cerebral artery (ACA) and the posterior cerebral artery (PCA). Thus, infarctions of the splenium are rare and can manifest with diverse neurological symptoms.

Case report

A 63-year-old female who presented with sudden onset left side upper limb weakness associated with imbalance on walking and slurring of speech for 2 days. She denied preceding fever, neck pain, palpitation, altered consciousness or seizures. She was a diagnosed patient with diabetes and hypertension for 6 years with good compliance. On examination patient was conscious and rational with Glasgow Coma Scale (GCS) 15 and having dysarthria and impaired tandem gait without other cranial nerve palsies or cerebellar signs. She had left sided hemiparesis with Medical Research Council (MRC) grade 3 and 4 in upper and lower limbs respectively. Reflexes and sensory findings were normal with positive Babinski sign. Other system examination was unremarkable. Fluctuating severity and complexity of neurological signs suggested an inflammatory pathology or multiple infarcts. Her inflammatory markers were normal. Electrocardiogram and 2D-echo showed no abnormalities while non-contrast CT of the brain showed a hypodense lesion (23 HU) in the splenium of the corpus callosum towards the right side suggestive of acute infarction. By the second day of admission, limb weakness improved but had residual dysarthria and tandem gait abnormality. Patient was discharged with acute stroke management and rehabilitation.

Conclusions

Infarctions in splenium lead to network malfunctions rather than fixed focal impairments like cortical strokes. Therefore, this can result in fluctuating severity and task-dependent symptoms due to disruption of two hemispheric coordination.

Lithopedion: A Rare Case of Calcified Abdominal Ectopic Pregnancy

Maggonage CG^{1,2,*}, Shihab S¹, Herath C³, Wijetunga S^{2,4}, Dassanayake B^{2,5}, Abeysundara AB^{2,6}, Wijerathne AGG⁷

¹Department of Obstetrics and Gynaecology, Faculty of Medicine, University of Peradeniya

²Teaching Hospital Peradeniya

³Department of Radiology and Imaging, Asiri Hospital, Kandy

⁴Department of Pathology, Faculty of Medicine, University of Peradeniya

⁵Department of Surgery, Faculty of Medicine, University of Peradeniya

⁶Department of Anesthesiology and Critical Care, Faculty of Medicine, University of Peradeniya,

⁷Department of Anatomy, Faculty of Medicine, University of Peradeniya

Introduction

Lithopedion, or “stone baby,” is a rare complication of abdominal ectopic pregnancy, occurring in approximately 0.0054% of all gestations. It typically results from a foetal demise in an undiagnosed advanced ectopic pregnancy, which is subsequently calcified to avoid maternal infection. Most cases are discovered incidentally during imaging or surgery. We present a rare case of lithopedion discovered in a woman with no reported history of pregnancy, highlighting diagnostic challenges and sociocultural barriers to healthcare in a low-resource setting.

Case report: A 44-year-old Sri Lankan woman presented with sub-acute abdominal pain and heavy menstrual bleeding. Despite 16 years of subfertility, she had not sought medical care due to religious beliefs. Imaging revealed a calcified abdominal mass with bony elements suggestive of a lithopedion. Surgical exploration confirmed a well-formed foetal skeleton encapsulated in a calcified sac within the right adnexa. Histology revealed a degenerated ectopic gestation sac with fibrosis and dystrophic calcification, consistent with a lithopedion of approximately 32–34 weeks gestation. The mass was successfully excised via laparotomy, and the patient had an uneventful recovery. Histological examination revealed an old ectopic gestation sac within the mesosalpinx, encapsulated by a fibrous wall and omental tissue. A well-formed fetal skeleton was identified within the sac.

Conclusion: This case emphasizes the need to improve awareness and access to prenatal healthcare services, particularly in low-resource settings where sociocultural barriers persist. Addressing these barriers through targeted health education and improved healthcare infrastructure is essential to prevent rare outcomes like lithopedion and to enhance maternal health outcomes in low- and middle-income countries.

Spontaneous Fistula Formation in Healing Chronic Diabetic Plantigrade Foot Ulcers: The Concept of “Pyo-diversion”

Narampanawa H¹, Dissanayake DMAS¹, Peiris SPM¹

¹Department of Surgery, Faculty of Medicine, University of Peradeniya.

Introduction

The foot with its complex anatomy contains many facial planes which are closed off creating potential tight space for the collection of infectious exudates. Infection of the foot can be difficult to treat due to this many layered arrangements. The chronic plantigrade ulcers are commonly seen in diabetic patients, as a result of peripheral neuropathy, microvascular and macro vascular changes, predisposition to infection and foot deformities with increased plantar pressure. Standard treatment involves debridement, antibiotic therapy, and offloading. Wound healing is affected by both local and systemic factors. Of the local factors, accumulation of tissue debris and microbial products in the wound site play a major role. This observational case series elucidates the basis of an observed phenomenon of spontaneous drainage diversion or “pyo-diversion” where chronic diabetic plantigrade ulcers spontaneously open onto the dorsum of the foot leading to accelerated healing.

Methods

Three patients who were diagnosed with diabetic neuropathy, who presented to the surgical clinic with chronic poorly healing plantigrade ulcers were recruited for the study. The three patients had been managed with the standard treatment methods with poor response. The treatment outcome was serially followed up. At the time of presentation, each patient had developed a spontaneous opening on the dorsal surface of the affected foot. The spontaneously formed fistula was maintained throughout the treatment process while the standard treatment methods including antibiotics, wound dressing and offloading were continued for each of them.

Results

All three patients demonstrated a marked improvement in the wound healing, achieving a significant recovery within 2 to 3 weeks after formation of the fistula.

Conclusion

Understanding the anatomical pyo-diversion pathway would therefore encourage the development of new surgical interventions aimed at creating intentional drainage diversions to create alternative treatment methods for chronic plantigrade ulcers with poor response to standard therapy.

Student Preferences in Learning Anatomy Among First Year Medical Students: An Online Survey

Adikari SB¹, Kiringoda KGKC¹, Fernando RSR¹, Pathirana LYV¹, Amaratunga HA¹

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya

Introduction and Objectives

Learning preferences vary among individuals, and first year students learning anatomy are no exception. Anatomy being a visually oriented discipline, is traditionally taught through lectures, dissections, prosections, and microscopic observations. However, with the recent development and significant increase in the availability of online anatomy learning tools and artificial intelligence (AI) trends have changed.

Methods

A validated, pretested online Google Form-based questionnaire was used to gather data. Participation was completely voluntary and identifiable information was not gathered. One batch of medical students who had completed one year of the prescribed anatomy curriculum was recruited and the link to questionnaire was shared through social media and email. The questionnaire focused on 3 key areas: text book usage, revision strategies and the use of online learning tools.

Results

181 responded (72% response rate), primary text book was Clinical Anatomy by Regions (93%), Gray's Anatomy for Students (35%) Last's Anatomy (7.2%), Clinical Anatomy by Harold Ellis (3.9%). 77% were comfortable reading and understanding Clinical Anatomy by Regions, and 67% preferred it to be the officially recommended textbook. Popular revision strategies: answering past questions (60%), repeated reading (57%), peer discussion (56%). Reading aloud (35%) was less common. Only 17% reported listening to recorded lectures, while only 8% learned from seniors. For practicals, 55% preferred prosected specimens, while 31% favoured dissections. 77% used ChatGPT and other AI tools, followed by foreign YouTube channels (67%), local YouTube channels (58%), Anatomy 3D Atlas applications (56%), and anatomy teaching websites (32%). Notably, 10% of respondents stated they do not use lecture notes.

Conclusions

A notable shift from traditional textbook-based learning to online methods of studying anatomy has been observed among first year medical students. The integration of online learning resources, particularly AI tools and reputable YouTube channels should be considered to enhance student engagement when designing and revising anatomy curricula. Moreover, extended hours of cadaveric dissection appear less appealing to the current generation of learners, who may prefer a more balanced approach. Incorporating prosections, anatomical models, and interactive 3D applications alongside dissection sessions could better align with their learning preferences.

Clinical Assessment of Agenesis of The Palmaris Longus Muscle Among Undergraduates of Faculty of Dental Sciences, University of Peradeniya.

Amarasooriya AMDN¹, Adikaram AMWN¹, Dissanayake DMIH¹, Monarawila PSK¹, Angammana HMRW¹, Peiris HRD¹

¹Department of Basic Sciences, Faculty of Dental Sciences, University of Peradeniya

Introduction and objectives

Palmaris Longus (PL) muscle holds a significant clinical importance due to its applications in reconstructive surgeries. The objectives of the present study were to investigate the prevalence of agenesis of the PL muscle and its association with gender, ethnicity, hand dominance, height, and weight.

Methods

After receiving the informed consent total of 366 undergraduate dental students were recruited for the study. The demographic data including age, gender, and ethnicity was collected via a Google form. Height and weight were also measured. Handedness was assessed using the Edinburgh Handedness Inventory. The presence of PL was assessed by performing Schaeffer's test. The absence of PL was confirmed by using Thompson's test, Pushpakumar's "two finger sign" test, and Mishra's test I and II. The data was analysed using SPSS (Version 17) software.

Results

Out of 366 volunteers, 114 (31.1%) were males and 252 (68.9%) were females. In addition, 336 (91.8%) were right-handed and 30 (8.2%) were left-handed. Bilateral absence of PL was 14.9% and 19% in males and females, respectively. It was 18.5% and 10% in right-handed and left-handed students, respectively. Unilateral absence of PL was observed in 10.5% and 9.6% in males and females respectively. In right-handed students, the right-side absence of PL was seen in 4.5% of the cases while left-side absence was observed in 5.1%. In left-handed students, right-side absence and left-side absence of PL were recorded in 10% and 3.3%, respectively. In addition, Tamils showed the highest prevalence of PL absence (32.1%) while Sinhalese showed the lowest prevalence (26.7%).

Conclusions

The prevalence of PL absence is higher in females compared to males. The prevalence of PL absence is higher in right-handed students than left-handed students. No relationship was observed among the prevalence of PL absence and individual's weight and height

From Toe to Achilles Tendon: The Pathway of Spread of Infection: A Case Report

Narampanawa H¹, Dissanayake DMAS¹, Peiris SPM¹

¹Department of Surgery, Faculty of Medicine, University of Peradeniya

Introduction

The foot has a complex anatomy being a region with many tissue compartments and planes. The fore foot contains the toes while the hind foot is the heel with the mid foot lying in-between. In diabetic patients, forefoot wounds pose a significant risk of severe complications, ultimately leading to amputation. While uncommon, there is a possibility of the infection spreading proximally from the forefoot along the deep to the superficial anatomical planes, tracking all the way up to the space near the Achilles tendon. This progression is facilitated by the arrangement of the plantar soft tissues, flexor tendon sheaths and the calcaneus. In this case report we showcase a patient with an atypical, yet critical presentation.

Case Report

We report a case of a 61-year-old female with poorly controlled diabetes mellitus for 10-years presenting with poor healing and infection of the amputation site of the second toe of the right leg, following gangrene. On further examination she was found to have features of an ascending infection which had spread from the amputation site to the plantar compartment of the foot and ultimately to the superficial posterior compartment anterior to the Achilles tendon, while the tendon itself was spared. The patient was managed with serial wound debridement for the amputation site, followed by incisions over the deep plantar fascia and the superficial posterior compartment of the leg anterior to the Achilles tendon to allow drainage. Supportive care involving antibiotics, regular wound dressings and strict glycaemic control led to significant improvement in the subsequent weeks.

Conclusions

With this case report, we would like to emphasize the importance of early identification of atypical spread of the forefoot infection which causes delayed healing of the initial wound. Therefore, understanding the anatomical pathway of possible areas of involvement is essential in clinical practice to maintain a high index of suspicion to ensure timely diagnosis and early surgical intervention to mitigate further damage.

Analyzing Broca's Area: Methodological Framework for Physical Metrics

Abirathan B², Logehan C¹, Sahishnavi B¹, Sathurshan R¹, Trushel NA³, Dissanayake JK⁴

¹Belarusian State Medical University, Belarus,

²Faculty of Medicine, University of Peradeniya, Sri Lanka,

³Department of Normal Anatomy, Belarusian State Medical University, Belarus,

⁴Department of Anatomy, Faculty of Medicine, University of Peradeniya, Sri Lanka

Introduction

Broca's area, in the left inferior frontal gyrus, is vital for speech and language. Studies show females have up to 20% larger relative surface area than males, with MRI confirming anatomical differences, suggesting structural advantages linked to sex-related verbal ability and connectivity variations. This thesis aims to find out relationship between surface area of the Broca's area and total surface area of the brain laterally using the physical metrics

Methods

The methodology employed measuring tapes, vernier callipers, and augmented reality tools to reduce errors from the brain's complex surfaces. These tools provided a preliminary framework, despite anatomical variability. Ten brain specimens from BSMU's Anatomy Department, without demographic data, were studied. Broca's area, in the frontal lobe's inferior frontal gyrus (pars opercularis, Brodmann area 44; pars triangularis, Brodmann area 45), was identified anterior to the precentral sulcus, near the motor cortex. Seven measurements assessed Broca's area: vertical length from its top to the parietal lobe's top (V1); top to lower border, perpendicular to the lateral sulcus (V2); horizontal distance from frontal lobe's tip to central sulcus (H1); tip to Broca's lateral border (H2); lateral border to central sulcus, toward temporal lobe (H3); total brain length (Hmax) and height (Vmax).

Results

Analysis of seven measurements across ten specimens revealed significant variability in Broca's area dimensions: V1 (2.97–5.92 cm), V2 (2.88–3.64 cm), Vmax (6.82–10.92 cm), H1 (9.33–11.12 cm), H2 (2.31–3.22 cm), H3 (2.94–4.21 cm), and Hmax (13.94–17.14 cm).

Conclusion

Broca's area makes up about 7% to 11% of the brain's surface. While low-cost tools can help with early measurements, MRI and CT scans give more accurate results. Studies show that the shape and size of Broca's area don't always match the total brain size, and the biggest or smallest measurements don't consistently affect overall brain area. Standard methods and better imaging are needed to understand how this brain region supports language.

Hypothenar Hammer Syndrome Presenting as Ulnar Artery Pseudoaneurysm: A Case Report

Eshwara JM^{1,2}, Kosgallana EW³, Vishwajith RMP², Ruwanpathirana P², Gunawansa N²

¹Postgraduate Institute of Medicine, University of Colombo

²Department of Vascular Surgery, National Hospital Sri Lanka

³Department of Anatomy, Faculty of Medicine, University of Peradeniya.

Introduction

Hypothenar Hammer Syndrome (HHS) is an uncommon vascular disorder caused by repetitive trauma to the ulnar artery at the hypothenar region, leading to stenosis, thrombosis, or more rarely aneurysm/pseudoaneurysm. It is classically described in men in their forties engaged in occupations involving vibratory tools or repetitive impact. Here we present a notable case of a young patient, non-smoker who presented with a symptomatic pseudoaneurysm.

Case report

A 21-year-old right-hand dominant male, employed as a cloth packer in a garment factory, presented with a painful lump in the right hypothenar region for three weeks. Examination revealed a 2 × 2 cm smooth, pulsatile mass that partially collapsed on hand elevation. Tinel's and Allen's tests were negative, with no distal ischemia, gangrene, or ulnar nerve involvement. CT angiography demonstrated a distal ulnar artery pseudoaneurysm with preserved distal runoff. Given the symptomatic nature and occupational impairment, surgical excision was performed. A 4 cm longitudinal incision was placed immediately lateral to the hypothenar eminence, taking care to preserve the palm creases. The pseudoaneurysm and an associated venous malformation were excised with proximal and distal ligation of the ulnar artery. The ulnar nerve was preserved. Postoperatively, perfusion remained intact with no neurological deficit. The patient was started on physiotherapy and discharged the next day. He had an uncomplicated recovery at two-week follow-up.

Conclusion: HHS is usually reported in older men with manual occupations, but this case demonstrates its rare occurrence in a young adult. Clinical manifestations range from cold intolerance, finger cyanosis, altered sensation or finger gangrene. The current presentation of painful pulsatile mass is rare. CT angiography is the diagnostic modality of choice. Management includes conservative, endovascular, or surgical options. As this patient had a pseudoaneurysm, choice of management was surgical excision. This case emphasizes that HHS should be considered even in atypical patients, and timely surgery can achieve excellent outcomes.

Bilateral Duplication of the Optic Canals with Accessory Optic Canals opening to the Sphenoid Sinuses – A case report

Priyadarshani KMWW¹, Salgado S¹, Rebeira LG¹, Wickramarathna EAAM¹, K.D.C.H.M. Chandrasekara¹, L.I.S.De Alwis¹, K.M.Chandimal¹

¹Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka.

Introduction

The optic canal links the middle cranial fossa and the orbital apex and transmits the optic nerve and ophthalmic artery. Within the optic canal, the ophthalmic artery usually travels inferolateral to the optic nerve. Duplication of the optic canals is a rare anatomical variation, and bilateral duplication is very rare. This is developmental in origin, arising due to aberrant growth of the optic strut or due to thickening of the dura mater that lies between the optic nerve and the ophthalmic artery. When there is duplication of the optic canal, the optic nerve will pass through the main optic canal, while the ophthalmic artery will pass through the accessory optic canal.

Case report

Duplicated optic canals were observed in a 25–35-year-old male skull from the osteology collection of the department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka. This variation was observed bilaterally. The main optic canals were opened to the orbits. The accessory optic canals were opening to the sphenoid sinuses bilaterally. The length of the right main optic canal was 6.45mm, and the length of the left main optic canal was 6.69mm. The transverse diameter of the cranial opening of the right main optic canal was 3.82mm, and the vertical diameter was 3.62mm. The transverse diameter of the cranial opening of the left main optic canal was 4.08mm, and the vertical diameter was 3.61mm. The transverse diameter of the cranial opening of the right accessory optic canal was 3.98mm, and the vertical diameter was 3.79mm. The transverse diameter of the cranial opening of the left accessory optic canal was 3.93mm, and the vertical diameter was 4.25mm. The thickness of the septum between the right main and accessory orbital canals was 1.2mm, and the thickness of the septum between the left main and accessory optic canals was 1.56mm.

Conclusions

Bilateral duplication of the optic canals is a rare anatomical variation, and several studies have been recorded in the literature. If the optic nerve or the ophthalmic artery traverses the accessory canals which are opening to the sphenoid sinuses, they can get damaged during procedures related to the sphenoid sinuses, for example in endonasal transsphenoidal approaches.

Incomplete Unilateral Foramen Transversarium of the Atlas Vertebra: A Case Report

Rebeira LG¹, Wickramarathna EAAM¹, Priyadarshani KMWW¹, Chandrasekara KDCHH¹, LIS De Alwis¹, Chandimal KM¹.

¹Department of Anatomy, Faculty of Medicine, University of Wayamba.

Introduction

The atlas is the first cervical vertebra that is distinctive in its anatomy than other typical cervical vertebra, consisting of an anterior arch, a posterior arch, and two lateral masses. Each lateral mass gives rise to a transverse process, which contains the foramen transversarium. This foramen is clinically significant as it allows passage of the vertebral artery that supplies the brain. Although the atlas generally has a consistent morphology, variations of the foramen transversarium have been reported. Among these, absence of the costal element leading to an incomplete foramen is rare but noteworthy. Such variations may predispose patients to vascular complications and present challenges in radiological interpretation or surgical procedures involving the upper cervical spine. While several case reports of incomplete transverse foramina of atlas vertebra have been described worldwide, no studies or literature have been reported from Sri Lanka.

Case Report

During routine osteology demonstration classes for undergraduate medical students, an unusual finding was noted in an atlas vertebra. The incomplete foramen transversarium on the right side was identified. The length of the missing part of transverse vertebral foramina is 3.17mm in size. The left transverse foramen was normal and complete, measuring 7.43 mm in diameter. No additional abnormalities were detected.

Conclusion

This case highlights an incomplete unilateral foramen transversarium of the atlas, identified incidentally during osteology demonstration. Though rare, this anatomical variation is clinically relevant due to its close association with the vertebral artery. Awareness of such anomalies aids surgeons in preventing iatrogenic vascular injury during cervical operations and assists radiologists in accurate interpretation of cervical imaging.

Adult-Onset Primary Ewing's Sarcoma of the Right Atrial Wall : A Case Report

Bamunuarachchi V¹, Wijayawardhana KWSM², Wickramarachchi UI³

¹Department of Radiology, Changi General Hospital, Singapore,

² Department of Anatomy, Faculty of Medicine, University of Kelaniya, Sri Lanka,

³ Faculty of Graduate Studies, University of Kelaniya, Sri Lanka

Introduction

Primary cardiac tumours are rare, with only 25% being malignant. Ewing's sarcoma is thought to be derived from neural crest cells, possibly mesenchymal stem cells. While this tumour usually presents in bones of children, cardiac origin is rare. The prognosis is determined by the presence of metastasis and the primary site of the tumour.

Case presentation

A previously healthy 24-year-old female presented with chest discomfort, difficulty in breathing, abdominal distension and vomiting for a three-day duration. On examination, she was tachycardic (pulse 124/min) and dyspneic. Her blood pressure was within the normal range. Abdominal examination was unremarkable. Bilateral pitting ankle oedema was noted. The initial ECG showed tachycardia with sinus rhythm. A chest x-ray was taken and showed cardiomegaly with a globular heart and clear lungs. Gross pericardial effusion with a mass arising from the right myocardium without pericardial thickening and bilateral pleural effusion was noted in the ultrasound scan. Features indicative of cardiac failure were noted with grossly dilated inferior vena cava, gallbladder wall oedema and ascites. Despite supportive treatment, the patient passed away in a few hours. A pathological postmortem showed a mass arising from the right atrial wall. Histology was consistent with a small round cell tumour, showing CD99 positivity, with a potential diagnosis of Ewing's sarcoma.

Conclusion

This case report highlights a primary Ewing's sarcoma originating from the right atrial wall in an adult female, presenting with acute symptoms of chest discomfort, shortness of breath and autonomic symptoms. It challenges the conventional diagnostic paradigms and therapeutic approaches for this malignancy.

Importance of the Cadaver for the Study of Human Anatomy: A Survey Among Medical Students and Brief Review of Literature

Pratheepkumar V¹

¹Department of Normal Anatomy, Belarusian State Medical University, Minsk

Introduction and Objectives

Anatomy forms the foundation of medical education and is crucial for the development of knowledge base and practical skills as a future physician. While multiple resources are available for Anatomy teaching and learning, cadavers still remain a valuable educational tool in medical education enabling students to visualize real anatomic structures and enhancing their understanding of anatomy. With this background it was the aim of this study to assess medical students' perceptions regarding the use of cadavers for studying human anatomy and its effect on their academic performance.

Methods

A survey was conducted among medical students from various years and universities in Belarus and Sri Lanka to gather information on anatomy study methods/materials and their perceptions regarding those. The study analyzed the performance in Anatomy among first-year medical students at Belarusian State Medical University Minsk (BMSU) who utilized cadaver in their anatomy class. 23 articles from PubMed and Google Scholar published between January 2007 and December 2023 have been analyzed.

Results

A survey of 68 medical students from various years and universities revealed that 67 (98.5%) individuals preferred cadavers for anatomy study, 48 (70.6%) preferred textbooks (M. R. Sapin, Instant Anatomy), and 38 (55.9%) preferred an e-learning system. According to their feedback in the survey cadaver is a valuable learning tool for them 61 (89.7%), providing a hands-on approach to studying human anatomy 57(83.8%). It offers a clear view of topographic anatomical locations 44(64.7%) and helps improve memory 43(63.2%) and understanding of specimens.

Conclusions

The survey indicates that majority of students prefer cadavers as a primary learning tool, highlighting their importance in providing a realistic, hands-on understanding of anatomy. The study at BSMU shows that students who spent more time studying cadavers scored significantly higher in exams and those with initially low performance improved notably after cadaver dissection. Despite a decline in cadaver usage globally, evidence suggests that dissection remains essential for developing practical surgical skills and comprehensive anatomical knowledge among medical students.

Co-occurrence of Deformational Plagiocephaly and Metopic Suture in an Adult Sri Lankan Skull: A Case Report

¹Wickramarathna EAAM, ¹Ihalage WISM, ¹Priyadharshani KMWW, ¹Rebeira LG, ¹Chandimal KM

¹Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka.

Introduction

Plagiocephaly refers to an asymmetrical cranial shape caused by unilateral flattening, which may arise either from deformational factors or from premature closure of cranial sutures (craniosynostosis). The metopic suture is a fibrous articulation located along the midline of the frontal bone, and physiological closure is typically completed by nine months. Plagiocephaly is often associated with metopic synostosis, rather than an unfused metopic suture. The present case highlights the co-occurrence of plagiocephaly with an unfused metopic suture in an adult skull.

Case report

The specimen under study was an adult Sri Lankan dry skull with an estimated age of around 30 years, as the third molar teeth were preserved bilaterally. A distinct, preserved metopic suture was present in the frontal bone, extending from the glabella to the bregma. All other cranial sutures appeared normal, with no morphological features suggestive of craniosynostosis. Linear dimensions were obtained using a digital vernier calliper: metopic suture measured 330 mm in length, with a maximum deviation of 7.89 mm and a minimum deviation of 0.05 mm from the midline. Frontal bone showed left-sided flattening with compensatory bossing on the right. The occipital and parietal bones revealed right-sided flattening and contralateral bossing. In the vertex view, the skull exhibited a parallelogram configuration. Bulging of the mastoid process into the left side, slight anterior displacement of left internal acoustic meatus and symmetrical alignment of the temporomandibular joints at the cranial base were noted. The posterior aspect appeared normal without signs of lambdoid synostosis. There was a difference in the auricular heights on the left (115 mm) and right (112 mm) sides of the skull, further confirming the deformational plagiocephaly.

Conclusions: This case report presents a rare co-occurrence, wherein a patent metopic suture is observed in an adult skull with plagiocephaly.

Morphometric Analysis of Age-Associated Aortic Sinus Characteristics

Hanna A Pasiuk¹, Sahishnavi B², Logehan C², Sathurshan R², Shanoja S²

¹Department of Normal Anatomy, Belarusian state Medical University, Minsk, Belarus

²Medical Faculty for International Students, Belarusian State Medical University, Minsk, Belarus

Introduction and Objectives

Age-driven remodelling of the aortic sinuses and supralvalvular ridge substantially alters coronary blood flow and valve dynamics. Objective was to characterize age-associated morphological alterations in the aortic sinuses.

Methods

Thirty-eight autopsy-derived human hearts were obtained and demographic and clinical data, including was obtained from hospital records. The length of the supralvalvular ridges adjacent to the right coronary, left coronary, and non-coronary sinuses, were measured using a thin string carefully placed along the contours of each target area. Each sinus wall was examined for cholesterol plaques.

Results

Specimens from 18 females, 18 males, and 2 unspecified with age range of 52 – 78 years. Males had higher supralvalvular ridge lengths with a median measurement of 26.00 mm [23.00–28.00] in both left and right coronary sinuses and 24.50 mm [21.00–28.00] in the non-coronary sinus. Women showed medians of 23.50 mm [19.00–28.50], 24.00 mm [22.00–28.00], and 23.00 mm [21.00–27.00], respectively. Analysis revealed a moderate positive correlation ($r = 0.53$; $p < 0.05$) between the left and right coronary ridge lengths. The non-coronary showed no significant association with either of the coronary sinuses. Cholesterol plaques were unevenly distributed: 10.5 % of hearts had plaques in a single sinus, 15.8 % in two sinuses, and 34.2 % in all three. The left coronary sinus was the most commonly affected (55.3 %).

Conclusion

This study demonstrates sex- and age-related variability in supralvalvular ridge morphology. Male aortic roots generally exhibited longer ridge profiles, while aging was associated with ridge elongation in the right coronary and non-coronary sinuses, but not the left. Strong correlations between left and right coronary ridges suggest shared determinants, whereas the non-coronary sinus followed distinct mechanisms. Cholesterol plaques predominated in the left coronary sinus. These findings underscore the value of demographic-specific models to refine aortic root mechanics and guide personalized cardiovascular interventions.

Morphometric Analysis of the Proximal Tibia: A Study on Dry Bones

Dissanayake S¹, Perera ST¹, Kumarasinghe WAAM¹, Abeysiriwardana PS¹, Perera MDMR¹,

¹Faculty of Medical Sciences. University of Sri Jayewardenepura

Introduction and Objectives

The proximal tibia is the primary weight-bearing platform of the knee joint and plays a vital role in maintaining lower-limb alignment and stability. It is frequently involved in osteoarthritis, tibial plateau fractures, and reconstructive procedures such as osteotomy and total knee arthroplasty. Most knee implants are designed for European and North American anatomy, which may not accurately reflect the characteristics of the Sri Lankan population. Such discrepancies can result in implant-bone mismatch, persistent pain, and reduced quality of life.

Methods

The study was conducted on 102 dry human tibiae obtained from the Departments of Anatomy at the Universities of Colombo, Kelaniya, and Sri Jayewardenepura, comprising 53 left-sided and 49 right-sided bones. Each tibia was measured independently by two investigators using a digital vernier caliper (± 0.05 mm accuracy) and a standard measuring tape. Assessed morphometric parameters included tibial length, anteroposterior and transverse diameters of medial and lateral condyles, intercondylar anteroposterior diameter, intercondylar tubercle distance, and anterior and posterior intercondylar widths.

Results

Mean tibial length was 35.74 ± 2.13 cm, medial condyle anteroposterior diameter of 42.34 ± 5.21 mm and a transverse diameter of 30.83 ± 4.76 mm, calculated mean condylar area of 1308.93 ± 275.54 mm². Lateral condyle mean anteroposterior diameter of 37.38 ± 4.01 mm, a transverse diameter of 30.06 ± 4.57 mm, and an average area of 1129.35 ± 240.73 mm². Intercondylar region mean anteroposterior diameter of 43.62 ± 5.94 mm. Distance between medial and lateral intercondylar tubercles was 14.13 ± 4.87 mm, anterior intercondylar width 22.31 ± 5.94 mm, posterior intercondylar width 17.43 ± 4.06 mm. Independent-samples t-tests confirmed no statistically significant differences between left and right tibiae across any measurement.

Conclusions

This study demonstrates that proximal tibial morphometry in this sample is generally smaller than European reports (medial anteroposterior diameter ~ 47.7 mm, lateral ~ 43.5 mm) but comparable to Asian series (from Korea and India). In conclusion, these results provide a useful morphometric reference for surgical planning, implant development, and future anatomical research.

Morphometric Analysis of the Distal Femur and Proximal Tibia in a sample of dry bones

Jayarathna MJS¹, Illangasinghe NA¹, Kalani JADM¹, Rajamanthre PS¹, Amaratunga HA¹

¹Department of Anatomy, Faculty of Medicine, University of Peradeniya

Introduction and objectives

Accurate sizing of knee replacement prostheses is essential for achieving optimal function and longevity of implants in total knee arthroplasty (TKA). Implants available on the market are produced according to the dimensions of the Western population, and even the smallest prosthesis causes overhang and may not be ideal for the Sri Lankan population.

Methods

A total of 31 femurs and 36 tibial plateaus obtained from the bone museum at the Department of Anatomy, Peradeniya, were analyzed. The bones were of undetermined sex and age, but all were adult bones. A calibrated digital vernier caliper and a standard tape measure were used to take measurements in millimeters (mm). A single investigator took measurements to ensure accuracy. The measurements obtained in the femur were: bicondylar width (BCW), medial/ lateral condylar transverse diameter (MCTD, LCTD) and anteroposterior width (MCAPW, LCAPW) and the intercondylar width (ICW), while in the tibial plateau, they were transverse and anteroposterior diameters of the medial/ lateral condyles (MCTD, LCTD, MCAPD, LCAPD).

Results

The sample consisted of 10 right-sided femurs. Mean values of MCTD, LCTD, MCAPW, LCAPW, BCW, and ICW were 23.6, 23.4, 53.8, 56.1, 70.3, and 21.5 mm, respectively. There were 21 left-sided femurs. Mean values of MCTD, LCTD, MCAPW, LCAPW, BCW, and ICW were 23.6, 23.5, 56.5, 57.5, 66.9, and 20.1 mm, respectively. No significant differences were seen in measurements between the right and left side femurs, using the Mann-Whitney U test (MCTD: $p=0.833$, LCTD: $p=0.884$, MCAPW: $p=0.492$, LCAPW: $p=0.917$, BCW: $p=0.059$, and ICW: $p=0.327$). There were 19 right-sided tibias. Mean values of MCTD, LCTD, MCAPD, and LCAPD were 28.6, 29.0, 41.5, and 35.8 mm, respectively. There were 17 left-sided tibias. Mean values of MCTD, LCTD, MCAPD, and LCAPD were 29.9, 31.5, 42.5, and 38.3 mm, respectively. Concerning LCTD and LCAPD, there was a statistically significant difference between sides when using Student's t-test ($p < 0.001$, $p=0.017$, respectively).

Conclusion

Morphometric analysis of dry distal femora and proximal tibiae provides critical anatomical data for refining knee prosthesis sizing.