

Abstracts of 1st International Online Conference on Clinical Reports [†]

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Abstract: The 1st International Online Conference on Clinical Reports (IOCCR 2025) was held online on 19–20 March 2025, organized by the open access MDPI journal *Reports* (ISSN: 2571-841X; IF: 0.8). This conference offered a platform for doctors, experts, and medical-related practitioners in the field of medical cases, images, and videos in human medicine to engage in an exchange of ideas and share cutting-edge research findings. The conference encompassed diverse facets of clinical medicine, including, but not limited to, the following: Disaster/Climate Change Medicine, Cancer, Cardiovascular Diseases, Oral Diseases, and Orthopedic Surgery.

Keywords: climate change medicine; cancer; cardiovascular diseases; oral diseases; orthopedic surgery

1. Disaster/Climate Change Medicine

1.1. Advancing Disaster and Climate Change Medicine: Bridging Health Resilience and Emergency

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The increasing effect of climate change and disasters presents health threats globally, as it brings about infectious diseases, heat-related diseases, and related stress. This study aims at examining disaster- and climate-change-related medicine, a field that tackles the means, methods, and ways through which the sector ensures that it becomes more resilient during disasters and is prepared adequately to handle disasters and strengthen health systems' capacity to cope with disaster risks in regions that are prone to such disasters.

Methodology: Quantitative surveys of health information from disaster zones were conducted and complemented by qualitative interviews with doctors and relevant authorities. Actual flood and heat wave situations in India were modeled to capture healthcare response scenarios. Quantitative data analyzed the impact of climate change on medical interventions, and, in terms of qualitative data, reviews discussed the major advances in disaster medicine.

Results: The completed analysis showed that the implementation of specific climate-related protocols decreased the mortality by 25% in disaster situations. Public awareness and regular pre-disaster immunization checks took massive steps towards controlling diseases that are spread by vectors such as dengue and malaria. Efforts that provided mental health support, such as telemedicine, lowered the psychological distress in the targeted groups by 40%. The specific recommendations for climate change adaptation



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are the extension of healthcare structures that are immune to climate change, disaster preparedness education for medical personnel, and a focus on and the enhancement of community-based health initiatives.

1.2. Clinical Presentation and Assessment of Medical Treatments for Community-Acquired Pneumonia (CAP) Case in Thailand

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Introduction: Pneumonia is a lung infection caused by microorganisms, transmitted through coughing and inhaling infected droplets. Symptoms include a persistent cough, shortness of breath, fever, and chest pain. Diagnosis involves medical history, chest X-rays, lab tests, and exams. Improved environmental conditions have led to a decrease in pneumonia cases.

Methods: The 88-year-old male patient exhibited symptoms, including a persistent cough, fever, and breathlessness, from the aspiration of pathogens from the upper respiratory tract into the lungs. The chest X-ray revealed new opacity in the interstitial lung tissue of the left lower lobe, suggesting a lung infection.

Results: This patient's pneumonia is classified as community-acquired pneumonia (CAP), as it developed within 48 h of hospitalization. Both influenza A and B and COVID-19 rapid antigen test results were negative. According to the American Thoracic Society, patients with CAP and risk factors for MRSA (methicillin-resistant *Staphylococcus aureus*) and *Pseudomonas aeruginosa* should be treated with extended-spectrum antibiotics. Empiric options for *P. aeruginosa* include piperacillin–tazobactam, cefepime, and meropenem. The doctor prescribed meropenem 1 g intravenous therapy (IV) every 8 h. Due to the patient's kidney problems (CrCl: 36 mL/min; estimated glomerular filtration rate (eGFR): 46 mL/min/1.73 m²), the dosage should be adjusted to 1 g IV every 12 h, which results in a drug-related problem (DRP): overdose.

The patient's CURB-65 score (confusion, uremia, respiratory rate, blood pressure, and age of 65 or older) of 2 indicated the need for inpatient care, making hospitalization appropriate. A comparison using indication, efficacy, safety, adherence, and cost (IESAC) suggests changing to oral ciprofloxacin, which is more effective against *P. aeruginosa*, has fewer side effects, and is less expensive than levofloxacin.

Conclusions: The goal of therapy is to eliminate the pathogen and prevent complications or recurrence. The therapeutic plan includes completing the full course of antibiotics and monitoring for complications. Patient education emphasizes adherence to the treatment plan for optimal recovery.

1.3. Clinical Presentation and Assessment of Medical Treatments for Ischemic Stroke: A Case Study from Thailand

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Introduction: Stroke, or cerebrovascular disease, occurs when the brain is deprived of blood due to blocked or ruptured blood vessels, leading to brain tissue damage. Ischemic stroke, which accounts for about 80% of all strokes, is primarily caused by blood clots, often due to atherosclerosis. Other causes include blood vessel inflammation or embolism, where foreign material blocks blood flow to the brain.

Methodology: Assessment of Current Drugs and Therapy:

The patient presented with symptoms of ischemic stroke, such as left-sided facial droop and a stiff tongue, and was stabilized during the acute phase. To prevent recurrence, secondary prevention was necessary. Diagnosed with cardioembolic stroke and a CHA2DS2-VAS score of 6, indicating a high risk of recurrent stroke, the patient required an anticoagulant. Options included Warfarin, Dabigatran, Rivaroxaban, Apixaban, and Edoxaban.

Results and Conclusion:

The IESAC table shows that Non-Vitamin K Antagonist Oral Anticoagulants (NOACs) generally present a lower risk of ischemic stroke than Warfarin, though they are more expensive. Rivaroxaban is not recommended for those with a creatinine clearance of 30 mL/min.

Given the patient's participation in the 30-baht (THB) healthcare program and stable INR levels on Warfarin (3 mg) for a year, it was decided that Warfarin be continued. To address other stroke risk factors, Atorvastatin (40 mg), Nebivolol (5 mg), and Enalapril (5 mg) were prescribed to control cholesterol and blood pressure.

The CHA2DS2-VAS should be reassessed at each visit to evaluate stroke risk. INR levels must be monitored if the patient is on Warfarin. Bleeding, chest tightness, difficulty breathing, and severe headaches need to be monitored. If INR is not within the target range, switching to an NOAC, like Apixaban 5 mg, twice daily is recommended. The patient should consistently manage atrial fibrillation, dyslipidemia, and hypertension, monitor symptoms using BEFAST (Balance, Eyes, Face, Arms, Speech, and Time), and seek immediate medical help if any signs appear.

1.4. Enhancing Pandemic Response Through Reliable Remote Monitoring and Patient-Centered Telemedicine Solutions

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Introduction: The COVID-19 pandemic highlighted the critical need for scalable solutions to manage infectious diseases during health crises. Home isolation and remote monitoring for mild cases became essential to prevent healthcare system collapse. StepCare, a remote monitoring software medical device, facilitates symptom monitoring, prioritization, and early intervention.

Methods: A single-center, prospective study was conducted at the Osakidetza OSI Bidasoa center to evaluate the reliability, usability, and clinical impact of StepCare during the first wave of the pandemic. Thirty-five symptomatic COVID-19 patients (51% men; 49% women; mean age: 34.5) were monitored for 7.5 days. Clinical safety was evaluated by comparing StepCare's severity categorizations with clinical team assessments across 228 cases. Usability and satisfaction were measured through in-app data and post-study surveys with patients and clinicians.

Results: StepCare demonstrated clinical safety and reliability, showing a conservative approach to its severity categorizations in 100% of cases and aligning with the clinical team's assessments in 90.4% of cases. The patients rated the system as an intuitive, suitable, and safe tool, scoring it 9.12/10 for usability and satisfaction, with an 86% adherence rate and 83% recommending it. From a public health perspective, StepCare significantly improved the workflow efficiency by reducing the time required for patient management by 25% and decreasing the associated costs by 84%. The direct cost savings included a 100% reduction in home visits (EUR 144.74) and patient-initiated calls (EUR 17.41), and a 33% reduction in follow-up calls by healthcare staff (EUR 50.79 to EUR 33.86), resulting in a total cost drop from EUR 212.94 to EUR 33.86 per patient.

Conclusions: StepCare highlights telemedicine's role in disaster medicine, supporting remote monitoring of COVID-19 patients, improving clinical decisions, and optimizing the resource allocation while ensuring patient safety. Its high usability and satisfaction among both patients and clinicians make it a scalable solution for health emergencies. This study confirms its reliability, ease of use, and efficiency over standard care.

1.5. Human Metapneumovirus (hMPV)-Related Pneumonia in Immunocompetent Adults: Case Report, Imaging Findings, and Comparison with RSV

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Introduction: hMPV is an emerging respiratory pathogen that has increasingly been recognized as a result of advancements in molecular diagnostics, thereby enhancing the detection and characterization of the agent. Those with a severe form of the disease are typically either pediatric/elderly or immunocompromised. hMPV-associated pneumonia in immunocompetent adults remains largely unexplored. This paper reviews a case of severe hMPV-associated community-acquired pneumonia in an immunocompetent adult and examines different chest CT findings in comparison to those in respiratory syncytial virus infections.

Methods: We describe a case of 68-year-old immunocompetent male who had hMPV-induced CAP that was confirmed by multiplex RT-PCR. The etiology of the imaging findings was determined. Moreover, the study retrospectively assessed CT scans of 10 hMPV-positive patients presenting with pulmonary symptoms. Comparing them with those from 13 patients with RSV-related pneumonia helped to outline imaging differences and establish a time course of the hMPV-related pneumonia.

Results/Discussion: The case showed bilateral ground glass opacities and consolidations consistent with viral pneumonia. Early molecular diagnostics allowed for precise pathogen identification, guiding the appropriate treatment and reducing unnecessary antibiotic use. Retrospective analysis demonstrated that hMPV pneumonia typically exhibits asymmetric findings, including ground glass opacities, consolidations, nodular opacities, and bronchial wall thickening. Conversely, RSV pneumonia showed more symmetric bilateral interstitial involvement. Over time, hMPV-related interstitial pneumonia transitioned into bronchitis or bronchiolitis before resolving.

These findings highlight the need for hMPV-specific diagnostic testing and imaging in clinical workflows, which will improve management and reduce inappropriate antibiotic usage. Further research is necessary to better differentiate hMPV and RSV, thus guiding prevention and therapeutic strategies.

1.6. Impact of Propensity Score-Adjusted Targeted Intervention on Survival Outcomes Among HIV-Infected Patients: A Clinical Trial Analysis

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Background: This study investigates the survival outcomes of HIV-infected individuals receiving different treatment regimens compared to a control group. Utilizing a cohort dataset with demographic and clinical information, this research aims to assess the impact of various factors, including age, education, and travel time, on survival while controlling for confounding effects using propensity score adjustment.

Methods: A total of 380 HIV-infected patients were included in the study, categorized into an intervention group receiving a specific treatment regimen and a control group. The primary outcome measured was the time to death or censoring. Survival analysis was performed using the Cox proportional hazards model, adjusted for potential confounders, including treatment (intervention and control), age, education, travel time, and gestational age at enrollment. Propensity scores were also incorporated to adjust for treatment selection bias.

Results: The Cox model revealed a significant protective effect of the intervention on survival (hazard ratio (HR) = 0.583; $p = 0.045$), indicating that the treatment improved survival outcomes compared to the control group. After adjusting for propensity scores, the relationship between the intervention and survival remained significant (HR = 0.631; $p = 0.106$), suggesting the robustness of the treatment's effect even after accounting for confounding variables. Other covariates, such as age, education, and travel time, did not show significant independent effects on survival, likely due to their correlation with the treatment variable.

Conclusion: This study highlights the crucial role of the intervention in enhancing survival among HIV-infected individuals. The use of propensity score adjustment improves the validity of these findings by mitigating confounding bias in observational data. These results highlight the importance of ART (antiretroviral therapy) in HIV management and demonstrate the utility of statistical methods like propensity scores in clinical research.

Keywords: HIV; survival analysis; intervention; control group; treatment effect; propensity score; Cox proportional hazards model; clinical trial

1.7. Proteolyzed but Not Full-Length Galectin-9 in Plasma Predicts the Prognosis of COVID-19

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Introduction: Increased circulating galectin-9 (Gal-9) is associated with COVID-19 severity. Gal-9 structurally consists of two homologous carbohydrate-recognition domains (NCRD and CCRD) linked by a linker peptide highly susceptible to proteolysis. Plasma Gal-9 NCRD with an attached truncated linker peptide (N-cleaved-Gal-9) is a severity marker for COVID-19, indicating a higher AUC than full-length (FL)-Gal-9. This study

aims to determine whether N-cleaved-Gal-9 in plasma on admission serves as a reliable predictor of the hospitalization period for COVID-19.

Methods: We examined 44 COVID-19 patients admitted to Sendai City Hospital. FL-Gal-9 ELISA and Tr-Gal-9 ELISA measured FL-Gal-9 and both Gal-9-containing NCRDs (FL-Gal-9 and N-cleaved-Gal-9), respectively. N-cleaved-Gal-9 levels were calculated by subtracting the FL-Gal-9 levels from the Tr-Gal-9 levels. The time course of FL-Gal-9 and N-cleaved-Gal-9 levels from the day of admission to after discharge were monitored.

Results: FL-Gal-9 and N-cleaved-Gal-9 levels on admission were positively correlated with the hospitalization period ($r = 0.3964$ and 0.5676 , respectively). N-cleaved-Gal-9 levels on admission in the hospitalization ≥ 7 days group were higher than those in the hospitalization ≤ 6 days group, and the levels in both groups converged to the same extent at discharge and after. N-cleaved-Gal-9 (AUC = 0.7900) but not FL-Gal-9 on admission significantly discriminated both groups, whereas the CRP and P/F ratio on admission indicated AUC values of 0.7727 and 0.8268, respectively. The sensitivity of N-cleaved-Gal-9 was higher than that of CRP. N-cleaved-Gal-9 levels were positively correlated with the CRP levels during hospitalization, but not at discharge and after, suggesting Gal-9 proteolysis is upregulated along with abnormal CRP. N-cleaved-Gal-9 levels were negatively correlated with the P/F ratio only on admission, suggesting that Gal-9 proteolysis is associated with respiratory failure.

Conclusion: Plasma N-cleaved-Gal-9 on admission predicted the hospitalization period more accurately than CRP in COVID-19 and demonstrated its performance by simultaneously measuring the CRP and P/F ratio. These findings contribute to the management of prognosis in COVID-19, although larger, more diverse cohorts are needed to validate the findings.

2. Cancer

2.1. Improving the Safety of Hormone Replacement Therapy (HRT) Prescribing in Primary Care

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Introduction: HRT is a core component of treating menopausal symptoms, but it must be prescribed safely. Crucially, patients with a uterus on estrogenic HRT must also have a concomitant progesterone component to provide protection against endometrial hyperplasia, a major risk factor for endometrial cancer. Therefore, a QIP evaluating HRT prescription and documentation was performed, including steps to try and improve practice.

Methods: At a large Northwest London GP practice, all of the registered patients with estrogen prescribed within the past six months were identified. Their digital records were then checked for the safe co-prescription of progesterone, a Mirena intrauterine system (IUS) inserted within the past five years, or a preventative factor against endometrial cancer, such as previous total hysterectomy. Additionally, clinicians' notes were assessed for how HRT reviews had been undertaken and documented.

Results: A total of 215 patients received estrogen, of which 42% had progesterone prescribed and 32% had Mirena IUS safely within its five-year license. However, none of these intrauterine devices had been correctly coded completely to include the expiry date. The remaining 26% did not need simultaneous progesterone as forty-eight patients had a history of total hysterectomy, six were transgender women, one had uterine agenesis, and two were topical vaginal estrogens. The HRT reviews were not documented in a consistent way, thus highlighting the necessity for a standardized Emis template.

Conclusions: All of the patients prescribed estrogen had appropriate endometrial protection at this GP surgery. However, in order to facilitate thorough reviews and efficient prescription of HRT by primary care clinicians in the future, there needs to be consistent documentation. The introduction of the aforementioned template aims to enhance HRT practice in the community healthcare setting, and should be paired with patient education, including awareness regarding the IUS lifespan.

2.2. A Rare Case of Primary Pulmonary Neuroendocrine Tumor Presenting with Cushing Syndrome

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Background: Cushing syndrome is a rare endocrine disorder caused by excess cortisol production, leading to various clinical manifestations. Primary pulmonary neuroendocrine tumors (PNETs) are uncommon causes of ectopic Cushing syndrome, accounting for only 1–5% of all PNETs.

Case Presentation: We report a rare case of a 45-year-old female presenting with a 6-month history of weight gain, hypertension, and hyperglycemia. Physical examination revealed moon facies, buffalo hump, and purple striae. Laboratory tests confirmed hypercortisolism, with elevated 24 h urine free cortisol and midnight cortisol levels. Imaging studies revealed a 3.5 cm right hilar mass. Histopathological examination and immunohistochemistry confirmed a primary pulmonary neuroendocrine tumor (PNET) of intermediate grade.

Management and Outcome: The patient underwent successful surgical resection of the tumor via a right upper lobectomy. Postoperative cortisol levels normalized, and Cushingoid features resolved. The patient remained disease-free at 12-month follow-up.

Conclusion: This case highlights the rare association between primary pulmonary neuroendocrine tumors and Cushing syndrome. Early recognition and surgical intervention can lead to the successful management of this rare condition. This report contributes to the limited literature on this topic and emphasizes the importance of considering PNETs in the differential diagnosis of ectopic Cushing syndrome.

2.3. Adjuvant Nivolumab for Residual Disease Post-Neoadjuvant Chemoradiation and Surgery for Esophageal Squamous Cell Carcinoma—Are We There Yet?

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Background Information: Esophageal carcinoma is one of the most aggressive malignant diseases. At present, neoadjuvant chemotherapy and chemoradiotherapy are regarded as the standard modalities for the treatment of locally advanced esophageal cancer. Patients receiving neoadjuvant therapy and reaching a pathological complete response have better survival outcomes and a lower recurrence risk. In those not achieving pathological CR, nivolumab is recommended as per NCCN, ESMO, and ASCO guidelines. The advantages of adjuvant nivolumab were shown in the CheckMate 577 trial. At a median follow-up of 24.4 months, the median disease-free survival was twice as long with nivolumab (22.4 versus 11 months; HR for disease progression or death was 0.69). The overall survival data

were not sufficient. While it was well tolerated, it is unclear whether the use of this treatment is feasible in our developing country, as most patients are not able to afford this expensive medication.

Methods and Results: At our institution, we conducted a retrospective study of esophageal squamous cell carcinoma patients who underwent the neoadjuvant CROSS protocol followed by surgery for a period of 2 years. Of the total forty-three (43) esophageal squamous cell carcinoma patients, seventeen (17) had a complete pathologic response. Out of the twenty-six (26) patients with residual disease, only one (1) received adjuvant nivolumab. Nivolumab was well tolerated. Three patients underwent chemotherapy, and the rest entered the follow-up period. The patient who received nivolumab is now in the follow-up period and has had disease-free survival for 40 months so far. Overall survival has not been reached yet.

Conclusions: Among patients treated with neoadjuvant chemoradiotherapy, the majority of recurrences occur within one year. The pattern of recurrence was distant, locoregional, or both in 60, 30, and 10% of patients, respectively. Although guidelines recommend nivolumab for patients with residual disease, cost constraints prevent most of them from benefitting from this treatment in developing countries like India. To ascertain what can be done to further delay recurrence and gain better disease-free survival rates, many more studies are required.

2.4. Association Between TFR2 Gene Variant rs7385804 and Hemochromatosis, and Its Role in Iron-Related Carcinogenesis in Pakistani Population

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Hemochromatosis is an autosomal recessive iron overload disorder characterized by excessive iron accumulation, which can lead to various health complications, including liver fibrosis, cirrhosis, and an increased risk of hepatocellular carcinoma (HCC). Iron overload promotes oxidative stress, DNA damage, and cellular proliferation, all of which are implicated in carcinogenesis. The TFR2 gene variant rs7385804 has been implicated in hemochromatosis; however, its role in the Pakistani population and its potential link to cancer progression remain unexplored. This study aimed to investigate the association between the TFR2 gene variant rs7385804 and hemochromatosis in Pakistani individuals, and assess its possible role in cancer-related mechanisms. We employed a case-control study design, recruiting 200 hemochromatosis patients and 200 healthy controls from the Pakistani population. Genomic DNA was extracted from peripheral blood samples using the phenol–chloroform method. Sanger sequencing and Tetra-ARMS PCR were used to detect the TFR2 gene variant rs7385804. Our results demonstrated a significant association between the TFR2 gene variant rs7385804 and hemochromatosis in the Pakistani population ($p < 0.001$). The frequency of the variant allele was higher in the patients (35%) compared to the controls (15%). Sanger sequencing confirmed the presence of the variant in 70% of patients, while Tetra-ARMS PCR showed 90% concordance with sequencing results. Iron overload, mediated by TFR2 dysregulation, can lead to oxidative stress and genomic instability, which are key drivers in the development of hepatocellular carcinoma and other

malignancies. This study highlights the utility of Sanger sequencing and Tetra-ARMS PCR in detecting the TFR2 gene variant rs7385804, and provides evidence that this variant may serve as a genetic marker for hemochromatosis and a potential contributor to iron-related carcinogenesis in the Pakistani population. Further studies are required to validate these findings and elucidate the clinical implications of this association in cancer development.

2.5. Colonic Stenting—Alternative to Diversion Colostomy in Advanced Colonic Carcinoma

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Background: Self-Expanding Metallic Stents (SEMSs) are an effective way to relieve malignant colonic obstruction. In those with incurable disease, stents may provide palliation and avoidance of surgery and its associated complications. Emergent surgery for colonic obstruction has historically had a high mortality rate of 10% to 30%. Colonic SEMSs can also decrease the hospital stay and reduce the hospital costs compared to emergency surgery, and improve quality of life.

Methods: We retrospectively evaluated 16 patients with incurable cancer and colonic obstruction consecutively undergoing SEMS placement over a period of 18 months. All of the patients were diagnosed as having colorectal obstruction due to incurable CRC or extracolonic cancer. Major complications included events leading to surgical or endoscopic reintervention or requiring admission to the intensive care unit. Perforation, stent obstruction, and migration were considered to be major complications.

Results: During the study period, a total of 16 patients were treated endoscopically by the placement of a colonic SEMS. The average age of the patient was 61 years. There were 4 patients with rectal cancer, 10 patients with sigmoid and recto-sigmoid growth, and 2 patients with anastomotic recurrence at ileo-colic anastomosis after right hemicolectomy. In two patients, a stent could be placed on the second attempt after a failed first attempt. We had the following two complications: one patient experienced stent migration, following which the stent was retrieved and colostomy was performed; another patient experienced perforation, which was managed conservatively. The average survival time after stenting was less than 6 months. Colonic stents were maintained until death.

Conclusions: Colonic stenting offers a low-risk, high-success-rate alternative compared to surgery. It is also associated with a shorter hospital stay and less severe complications. In a cohort whose life expectancy rarely exceeds 6 months, this may translate to a better quality of life, earlier palliative chemotherapy commencement, and lower medical expenses. While SEMSs may induce lower acute complications and acute mortality rates, surgery may be associated with better long-term outcomes.

2.6. Deaths from Malignant Neoplasms of the Bronchi and Lungs in the Last Decade in Brazil: Insights for Improving Public Health

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Introduction: According to Brazil's National Cancer Institute, lung cancer had become one of the leading causes of preventable deaths by the end of the 20th century. However, malignant neoplasms of the bronchi and lungs remain one of the primary causes of mortality in Brazil. Therefore, it is necessary to study the epidemiological profile of these patients to develop better public health policies targeting the main at-risk group. **Methods:** This is a retrospective epidemiological study on deaths caused by malignant neoplasms of the

bronchi and lungs in Brazil between January 2014 and December 2023. Secondary data were collected and analyzed from the Department of Information and Informatics of the Unified Health System. Results: Between 2014 and 2023, 282,647 deaths were recorded due to malignant neoplasms of the bronchi and lungs in Brazil, with the highest number (31,150) reported in 2023. The most affected group were individuals aged 60 to 79 years, accounting for approximately 60% of total deaths nationwide. Men were 1.3 times more affected than women, and white individuals (60.29%) were the most affected by the neoplasm. Conclusions: The results highlight that, despite being preventable, lung cancer continues to affect thousands of Brazilians as of 2023. The epidemiological profile derived from the patterns and trends of this neoplasm over the years indicates a higher prevalence of deaths among white men aged 60 to 79 years. This characteristic may be associated with the accumulation of predisposing factors over the years and the specific risk factors for this group, such as smoking. By outlining the profile of these deaths, it becomes possible to design better prevention and treatment policies targeting the most vulnerable group affected by this type of cancer.

2.7. Early Oral Cancer Diode Laser Surgical Treatment: Case of Tongue Oral Squamous Cell Carcinoma Excised with Diode Laser

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Introduction: Oral squamous cell carcinoma (OSCC) is the most frequent cancer in the oral cavity; because of its aggressiveness, clinicians should diagnose it in its early stages (T1 and T2) to minimize postoperative complications and surgical invasiveness. In low-stage lesions, a preoperative evaluation with Intraoral High-Definition Ultrasound (IHDS) is recommended for assessing the lateral margins and depth of invasion with diode laser (DL) surgery, which avoids any bleeding during excision or complications, resulting in a less invasive surgical treatment that is minimally damaging to irradiated tissues.

We describe a case of a tongue carcinoma entirely excised with DL after a preoperative assessment by IHDUS.

Methods: A patient referred to our Complex Unit of the University of Bari "Aldo Moro" complained of a painful ulcerated swelling of the right tongue margin. An IHDUS of the lesion revealed a hypoechogenic area measuring 2.7 mm in depth. Surgical excisional biopsy was performed with a diode laser (4W, c.w.; Lasotronix, Poland), also including wide perilesional margins. The specimen was sent for histopathological exam. No stitches were needed.

Results: The histopathological exam confirmed the diagnosis of highly differentiated OSCC. Clinical follow-ups were performed weekly for 1 month and monthly for 6 months; complete healing was observed in 30 days. No complications or recurrences were detected.

Conclusion: OSCCs must be intercepted and treated in their early stages (T1 and T2) to reduce mortality incidence and to possibly avoid surgical invasiveness associated with tumor size. Histological examination is the gold standard for staging and diagnosis; diode laser excisional biopsy of early-stage OSCCs is recommended to reduce surgical bleeding or complications and to minimize damage to perilesional tissues.

2.8. Epidemiological Analysis of Leukemia Hospitalizations Among Children and Adolescents in Brazil (2021–2024): Insights for Improving Pediatric Cancer Care and Public Policies

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Introduction: Leukemia, particularly acute lymphoblastic leukemia (ALL), is the most common cancer among children and adolescents in Brazil, significantly impacting the Unified Health System (SUS). This study aims to analyze the epidemiological profile of hospitalizations for leukemia in the SUS from 2021 to 2024, considering age, sex, and hospitalization characteristics, to support improvements in care strategies and public policies for pediatric cancer in Brazil.

Methods: This cross-sectional study used data from the DATASUS platform. The variables analyzed included the total number of hospitalizations for neoplasms and leukemia in Brazil, segmented by age group (0–19 years) and sex, from 2021 to 2024.

Results: From 2021 to 2024, hospitalizations for neoplasms among children and adolescents in Brazil increased. In 2021, there were 60,280 admissions, with 35.08% due to leukemia, predominantly among males (12,424 cases), and in the age group of 1–4 years (6657 admissions). In 2022, admissions rose to 61,865, with 34.59% of these for leukemia, maintaining the same sex and age patterns. In 2023, there were 64,684 admissions, of which 33.37% were for leukemia, with males (12,560 cases) and the 5–9 age group predominating. In 2024, until November, 62,814 admissions were recorded, 34.02% for leukemia, again with males and the 1–4 age group prevailing.

Conclusions: The persistently high rate of leukemia-related hospitalizations among children and adolescents in Brazil, predominantly in males and in the 1–4 age group, emphasizes the need for strengthened early diagnosis and treatment efforts in the SUS. The increasing hospitalization trend from 2021 to 2024 highlights the urgency of improving public policies and the importance of an integrated approach to pediatric cancer care in Brazil.

2.9. Immunotherapy in Thymic Carcinoma: Adding Quality Years to in Patients with Cancer

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Introduction: Limited treatment options exist for patients with thymic epithelial tumors (TETs); this disease progresses even after platinum-based chemotherapy. Only a few prospective studies have investigated potential therapies in this setting. Recent studies have reported that PD-L1 is expressed in up to 70% of patients with TETs. The median progression-free survival even with pembrolizumab was 6.1 months in these relapsed refractory thymomas. However, we present a case of relapsed thymoma with longer PFS benefits using pembrolizumab.

Description: A 54-year-old female was initially diagnosed with locally advanced thymic carcinoma in January 2020. She received three cycles of gemcitabine + cisplatin followed by concurrent chemoradiation 66 Gy/33# with weekly cisplatin. She developed dilated cardiomyopathy and was started on cardiac medications. She had very minimal disease progression in January 2021 and was started on OMCT with endoxan and methotrexate tabs. After 6 months, due to further metastatic disease progression, she received nine cycles of nabpaclitaxel + carboplatin on 4 October 2021.

In October 2021, PET CT showed new metastatic nodes in the mediastinum, an interval increase in pericardial effusion, and bilateral pleural effusion. She was initiated on pembrolizumab three times weekly (from 16 November 2021). After three cycles, she had a partial response and was clinically better. She went on to receive 15 cycles, lasting almost 1 year, of pembrolizumab. She further developed oligoprogression in her lymph nodes, and hence received 40 GY/10 fractions of IMRT. On further disease progression, she was administered lenvatinib and capecitabine tabs. Finally, she succumbed to illness 52 months after diagnosis.

Conclusion: Pembrolizumab has shown encouraging antitumor activity in patients with advanced TET. Given the high incidence of autoimmunity, additional studies are needed to identify those who can benefit from pembrolizumab without immune-related adverse events. The median survival of patients with stage 4 thymic carcinoma is around 20–24 months; however, this can be prolonged to a greater extent with immunotherapy.

2.10. Management of Endocrine-Resistant, Recurrent Metastatic Hormone Receptor-Positive Breast Cancer: A Case Report

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Hormone receptor-positive (HR+) breast cancer represents a therapeutic challenge, particularly with endocrine resistance and progression, despite multiple lines of therapy. A 64-year-old woman with no significant comorbidities was diagnosed with carcinoma of the left breast (ER/PR-positive and HER2/neu-negative). She underwent modified radical mastectomy and axillary dissection with histopathological staging of pT2N2aM0. The patient received adjuvant chemotherapy (four cycles of adriamycin and cyclophosphamide followed by four cycles of docetaxel) and conventional radiotherapy (40 Gy/15 fractions). Hormonal therapy with anastrozole was initiated post-treatment. After 18 months, a local recurrence was noted on the anterior chest wall. PET-CT revealed a metabolically active nodule (SUV 6.2), confirmed by FNAC and excisional biopsy (ER-8, PR-8, HER2/neu-negative on FISH, and Ki-67 12%). The patient was switched from anastrozole to exemestane, but disease progression occurred within a year, suggesting endocrine resistance. Fifteen months later, PET-CT showed metabolically active cervical, axillary, and mediastinal lymph nodes, and a supraclavicular lymph node biopsy confirmed metastatic carcinoma (ER-0, PR-2%, HER2/neu-negative on FISH, and Ki-67 20%). Next, the patient received chemotherapy with gemcitabine plus carboplatin; however, clinical progression with increasing lymph node size was observed after two cycles. Eribulin is an antimicrotubule agent that destroys rapidly dividing cells. Therefore, we decided to switch the patient to treatment with eribulin (on day 1, with an 8-day regimen). After completing six cycles, PET-CT showed complete metabolic response (CMR) with a resolution of previous lesions. The patient tolerated eribulin well, with minimal side effects, and continues maintenance therapy. This case highlights the complexity of treating endocrine-refractory HR+ metastatic breast cancer, particularly in the context of progression with prior chemotherapy. The success of eribulin in achieving CMR highlights its effectiveness as a treatment option in heavily pretreated patients. Implementing tailored therapeutic strategies in this type of case remains essential for the treatment of advanced HR+ breast cancer.

2.11. Molecular Analysis of FokI in the Vitamin D Receptor (VDR) and Its Effects on VDR mRNA and Serum Vitamin D Concentrations in Uterine Leiomyoma Among North Indian Women: A Case-Control Study

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Uterine leiomyomas (ULs), commonly known as fibroids, are the most prevalent benign tumors affecting the smooth muscle of the uterus, impacting up to 60% of women of reproductive age. Emerging studies indicate an association between VDR polymorphisms and various cancers of the female reproductive system, including breast, ovarian, cervical,

endometrial, uterine, and vaginal cancers. In relation to uterine fibroids, several gene polymorphisms exist, including those within the VDR gene. This study seeks to examine the influence of FokI variants of the VDR gene, specifically focusing on susceptibility to ULs and their effects on VDR mRNA and serum vitamin D concentrations. A total of 200 participants, including 100 cases of UL and 100 controls matched for age and gender, underwent genotyping using TETRA ARMS PCR, followed by Sanger sequencing validation. Levels of VDR mRNA and vitamin D were also assessed through quantitative real-time PCR and ELISA methods, respectively. The association between this variant and leiomyomas was analyzed, along with clinico-pathological (obesity) associations. FokI exhibited a significant association with UL, especially with the CC genotype (odds ratio [OR]: 2.2; confidence interval [CI]: 1.00–4.93). VDR mRNA expression was found to be two times lower in UL patients ($p < 0.001$), along with decreased serum vitamin D levels ($p < 0.0001$). Correspondingly, homozygous genotypes of FokI were associated with lower serum vitamin D levels ($p < 0.001$). This research highlights the complex connection between VDR genetic variations, altered VDR functionality, and vitamin D metabolism in UL. Additional studies involving various populations are essential to confirm and generalize these results, potentially leading to tailored therapeutic approaches for vitamin D-associated disorders.

2.12. Papillary Thyroid Cancer Mimicking Thyroid Abscess

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Introduction: Suppurative thyroiditis comprises less than 1% of thyroid diseases. More often, this condition occurs in immunocompromised individuals or those with pre-existing thyroid disorders. In adults aged 50 years and older, thyroid cancer should also be excluded.

Methods: A 57-year-old male was urgently hospitalized with pain and tenderness of the left side of the neck. Ultrasonography revealed pronounced swelling of the neck soft tissues and a non-homogenous mass 2 cm below the skin surface of $9.0 \times 5.2 \times 9.0$ cm in size, which was spreading behind the sternum. Contrast-enhanced CT angiography of the neck demonstrated a thyroid gland left lobe lesion of $7.0 \times 6.0 \times 9.0$ cm in size with a thin capsule, containing a fluid component with strings of calcification and accumulating contrast at the periphery, tracheal compression by 50%, and massive locoregional lymphadenopathy. An abscess of the thyroid gland left lobe cyst was suspected.

Results: Considering the patient's stable condition, ultrasound-guided drainage of the formation under local anesthesia was decided upon and performed. In the postoperative period, the patient's vital signs were within the normal ranges, and he received conservative therapy to the full extent. A pathology report of the lesion stated the presence of a chronic abscess and a thyroid gland left lobe tumor of undetermined malignancy potential. The patient underwent left hemithyroidectomy in a planned manner. The specimen histological picture met the criteria for papillary thyroid cancer of the infiltrative follicular variant, pT3aN0M0, with signs of lymphovascular invasion. The edges of the resection were without signs of tumor growth. **Conclusions:** Thyroid cancer can be induced by inflammatory processes. In this case, a male patient was treated for thyroid abscess, but eventually he was diagnosed with papillary thyroid cancer. Since the risk of having cancer increases with age, older patients should be monitored more closely for the presence of malignancy.

2.13. Survival Analysis in Advanced Lung Cancer: A Weibull Survival Regression Model

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Survival analysis is crucial for patient management and treatment decisions, particularly for those with advanced lung cancer. Lung cancer remains one of the leading causes of cancer-related mortality globally, with survival rates significantly impacted by factors such as age, gender, performance status, and treatment regimens. This study applies the Weibull survival regression model to examine the survival outcomes of patients with advanced lung cancer. A retrospective dataset from the North Central Cancer Treatment Group (NCCTG) comprising 229 patients with advanced lung cancer was used for the analysis. The variables under study included survival times, censoring indicators, and a range of covariates, such as age, gender, ECOG performance score, Karnofsky performance score, calorie intake, and weight loss. The Weibull survival regression model was employed to analyze the impact of these covariates on the survival time. Model residuals were studied to assess the fit and appropriateness of the model. The survival regression model revealed a significant difference in survival probability based on key covariates. Factors such as the ECOG performance score, Karnofsky performance score, and age were found to significantly influence patients' survival. The model provided a good fit for the data, with the residual analysis indicating no major discrepancies. The survival curve showed the impact of covariates and its consistency in the trend. The findings highlight key prognostic factors that influence patients' survival by providing valuable insight for clinical decision making and personalized treatment strategies. The Weibull survival regression model offers a robust framework for incorporating multiple covariates and predicting patient survival outcomes more accurately.

2.14. Temporal Trends in the Diagnosis and Treatment of Leukemias and Lymphomas in Children and Adolescents in São Paulo State, Brazil (2000–2023): An Ecological Study

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Objective: The aim of this study was to analyze the temporal evolution in the intervals between the consultation, diagnosis, and treatment of leukemias and lymphomas in children and adolescents in São Paulo State, Brazil, from 2000 to 2023, identifying patterns of periodicity, temporal trends, and possible seasonality.

Methods: An ecological time-series study was conducted using data from 77 institutions registered with the Oncocenter Foundation of the State of São Paulo, grouped according to the International Classification of Childhood Cancer. Monthly median times between consultation, diagnosis, and treatment were calculated. Kwiatkowski–Phillips–Schmidt–Shin tests were applied to assess trends and stationarity; Seasonal Effects and Autocorrelation Structure was applied for the assessment of seasonality; the Ljung–Box test was employed for autocorrelation, supporting the application of Autoregressive Integrated Moving Average models.

Results: The time-series analysis showed significant trends in the median times between consultation and diagnosis and between diagnosis and treatment for both groups of neoplasms analyzed ($p < 0.01$). Significant autocorrelation was observed for leukemia and

myeloproliferative diseases, as well as lymphomas and reticuloendothelial neoplasms, with no indication of seasonality. Autoregressive models indicated robust temporal patterns necessary to predict the series' behavior over the study period (2000–2023).

Conclusion: This study identified significant trends in the times between consultation, diagnosis, and treatment for childhood leukemias and lymphomas, with no evidence of seasonality. These findings highlight the need for faster interventions in pediatric oncology care and reinforce the importance of robust databases to guide public policies aimed at early detection and appropriate treatment.

3. Cardiovascular Diseases

3.1. *A Female Patient with Fabry's Disease Achieved Successfully Corrected Left Ventricular Hypertrophy by Early Therapeutic Intervention*

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A 37-year-old woman, who had been healthy and had no symptoms, was diagnosed with Fabry's disease (FD), passed on by her mother, in 20XX-1, and came to our hospital after a negative T wave was found in her physical examination in 20XX. Echocardiography revealed a left ventricular ejection fraction of 72%, an interventricular septal wall thickness (I VS) of 10 mm, a posterior left ventricular wall thickness (PW) of 9 mm, and a cardiac MRI that showed no delayed contrast, but a deletion mutation in the GLA gene, the same as that in her mother, leading to the diagnosis of FD. Echocardiographic measurements of the left ventricular wall thickness showed no evidence of left ventricular hypertrophy, but the left ventricular relative wall thickness (RWT) was 0.43, indicating relative left ventricular hypertrophy, and enzyme replacement therapy was introduced early. After 6 months of treatment, the RWT was 0.57, but the RWT was rechecked every 6 months, and the left ventricular hypertrophy gradually improved to 0.52, 0.51, and 0.47; the progress was good.

According to the guidelines for the treatment of cardiomyopathy, hypertrophic cardiomyopathy should be suspected when the left ventricular wall thickness is greater than 13 mm. Of these patients, 5–10% have secondary cardiomyopathy, with FD being the most frequent. It is well known that, among FD patients with only mild left ventricular hypertrophy, those diagnosed relatively early without delayed contrast on cardiac magnetic resonance imaging can have improved left ventricular wall thickness with enzyme replacement therapy. We report here a review of the literature on the use of RWT to evaluate left ventricular hypertrophy in patients with very-early-stage FD.

3.2. *Time-Series Study That Analyzes the Distribution of the Number of Hospitalizations Due to Obesity and Atherosclerosis in Brazil over the Last 20 Years*

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Introduction: Data from the Brazilian surveillance system (Vigitel 2022) show that cardiovascular diseases account for about 28% of annual deaths in Brazil, while obesity (OB) impacts over 22% of the adult population. The relationship between atherosclerosis (AS) and OB is complex and bidirectional, with each condition exacerbating the other. Therefore, understanding their distribution and interaction in Brazil over time is essential to developing effective prevention strategies.

Methods: A time-series analysis was performed based on public and secondary data obtained from the Datasus platform. The analysis examined hospital admissions for OB and AS, and their distribution across Brazilian macroregions. Data were analyzed in ten-year intervals to compare the decades 2004–2013 and 2014–2023, aiming to identify temporal and regional trends.

Results: Between 2004 and 2013, Brazil recorded 62,511 hospitalizations for OB and 96,935 for AS. From 2014 to 2023, OB admissions rose to 107,272, reflecting a 71.60% increase compared to the previous decade. For AS, 232,524 hospitalizations were reported, indicating a 139.9% increase. Geographically, the south and southeast regions accounted for most of these admissions in the earlier period, representing 81.88% of OB and 72.76% of AS cases. This pattern persisted in the subsequent decade, with these regions comprising 87.14% of OB and 68.20% of AS hospitalizations.

Conclusions: The increase in hospitalizations related to OB and AS over the past 20 years reflects not only a shift in the health profile of the Brazilian population but also the influence of socioeconomic and behavioral factors, such as greater consumption of ultra-processed foods and a sedentary lifestyle. The concentration of cases in highly industrialized regions, such as the south and southeast, underscores the need for public policies to promote healthy habits and address regional health disparities.

3.3. A Case of Euglycemic Ketoacidosis in Shock Vitals During PCI for Non-ST Elevation Myocardial Infarction

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A 77-year-old man, who underwent PCI 11 times in all three branches for unstable angina pectoris, and who was taking SGLT2 inhibitor for diabetes mellitus, visited our emergency department because he felt chest strangulation when walking uphill. A 12-lead ECG showed a new ST elevation of more than 0.1 mV at V3~5, and transthoracic echocardiography showed mild hypokinesis in the intermediate posterior wall. Blood tests showed 448 pg/mL of NT-proBNP and that troponin T was slightly elevated at 0.056 mg/mL, leading to a diagnosis of non-ST-segment elevation acute myocardial infarction. The patient was urgently admitted to the hospital with a plan to perform PCI within 24 h of arrival. After admission, he was prohibited from food intake and started on continuous saline infusion. On the second day, CAG was performed, and 90% stenosis was found in the left coronary artery Seg. 13. During PCI at the same site, the patient went into shock vitals, with urinary ketones 4+ and metabolic acidosis, and was diagnosed with euglycemic diabetic ketoacidosis (EDKA). The acid–base balance was normalized by continuous intravenous small-dose insulin infusion and glucose loading, and the administration of hypertensive drug was terminated on the fifth day of the disease. SGLT2 inhibitors are known to be cardioprotective and renal-protective, and are currently used in many patients. Three days prior to surgery for the withdrawal of SGLT2 inhibitors is recommended, but it is difficult to ensure a sufficient withdrawal period in emergency surgery. There are few case reports of EDKA occurring in this manner, and we report this case with a discussion of the literature.

3.4. Association of Sensitivity to Thyroid Hormone Indices with 1-Year All-Cause Mortality and Readmission in Hospitalized Heart Failure Patients

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Introduction: This study aimed to explore the relationship between thyroid hormone sensitivity indices and 1-year all-cause mortality, as well as readmission, in hospitalized heart failure patients.

Methods: A total of 402 patients admitted to the Department of Cardiology at Heze Hospital, affiliated to Shandong First Medical University, between 2022 and 2023 were included. The composite primary endpoint was defined as all-cause mortality and heart failure readmission within one year after discharge. The following four thyroid hormone sensitivity indices were calculated: the free triiodothyronine (FT3)/free thyroxine (FT4) ratio, the thyroid stimulating hormone index (TSHI), the thyroid feedback quantile-based index (TFQI), and the thyrotroph thyroxine resistance index (TT4RI). Participants were grouped based on the quartiles of these indices. The Cox model assessed the effect of thyroid sensitivity on outcomes, with Kaplan–Meier survival analysis and Restricted Cubic Spline (RCS) analysis for non-linear relationships.

Results: In the multivariable Cox proportional hazards model, the hazard ratio (HR) for the composite endpoint in the highest FT3/FT4 ratio group was 0.59 (95% CI: 0.36–0.96; p for trend = 0.047). The Kaplan–Meier survival analysis indicated that a lower FT3/FT4 ratio was associated with a worse prognosis (log-rank p = 0.048). RCS demonstrated a linear relationship between the FT3/FT4 ratio and poor outcomes. In contrast, TT4RI in quartile 2 was associated with the lowest risk, while no significant associations were observed for TSHI or TFQI.

Conclusions: The FT3/FT4 ratio is inversely associated with 1-year all-cause mortality and readmission risk in heart failure patients. TT4RI in quartile 2 was linked to the lowest risk, while TSHI and TFQI showed no significant association with outcomes. These findings suggest that thyroid hormone sensitivity indices, especially the FT3/FT4 ratio, may have prognostic value in heart failure patients.

3.5. Association of Thyroid Feedback Quantile-Based Index with 90-Day All-Cause Mortality and Readmission in Patients Hospitalized with Heart Failure

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Introduction: Previous studies have reported a positive correlation between the thyroid feedback quantile-based index (TFQI), which reflects the central sensitivity of thyroid hormones, and the prevalence of cardiovascular diseases. However, the relationship between the TFQI and the prognosis of heart failure (HF) remains unclear. This study aimed to identify the optimal threshold for risk stratification and to determine which specific TFQI range is associated with poorer outcomes in HF patients.

Methods: This retrospective study included 402 individuals admitted to the Cardiology Department of Heze Hospital, affiliated with Shandong First Medical University, between 2022 and 2023. The primary outcome was 90-day all-cause mortality or HF readmission, as determined by routine follow-up. The X-tile project was used to obtain a threshold based on the composite outcome. Univariate and multivariable Cox regression, restricted cubic spline (RCS) analysis, and the construction of Kaplan–Meier curves were conducted.

Results: An analysis using X-tile software revealed that the optimal TFQI threshold for predicting adverse composite outcomes was 0.10. Patients with a TFQI value > 0.10 remained independently associated with adverse composite outcomes (adjusted HR: 1.89,

95% CI: 1.144, 3.121; $p = 0.013$). The RCS analysis demonstrated a linear relationship between continuous TFQI values and the hazard ratio of the composite inferior outcome. The Kaplan–Meier curves revealed a significant difference in the survival rates between patients with TFQI values ≤ 0.10 and those with values > 0.10 (log-rank test: $p = 0.004$).

Conclusions: A TFQI value > 0.10 can be used to identify HF inpatients who are at increased risk of mortality or readmission. Incorporating the TFQI into routine clinical assessments could enable healthcare providers to identify high-risk patients and implement more targeted interventions.

3.6. Can the Electrical Heart System Betray Severe Underlying Coronary Artery Disease? When Cardiac Arrhythmias Speak Loud and Clear

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Introduction: Coronary artery disease remains a leading cause of morbidity and mortality worldwide, driven by atherosclerotic plaque formation that narrows or blocks coronary arteries, manifesting across a spectrum, from asymptomatic stages to life-threatening acute coronary syndromes, including myocardial infarction. Can it be identified by understanding and recognizing heart arrhythmias, such as premature ventricular or atrial complexes or sinus bradycardia?

Methods: We present the case of a 79-year-old male with important cardiovascular comorbidities who presented to our clinic for shortness of breath on exertion and fatigue during low-intensity efforts. Upon closer examination using indispensable tools, such as ECG and ECG Holter monitoring, supraventricular ectopic beats (atrial bigeminy from the right superior pulmonary vein, predominantly) and non-sustained ventricular tachycardia on a bradycardic rhythm were diagnosed, in spite of maximal and optimal anti-ischemic treatment. In addition, a mild reduced left ventricular ejection fraction was assessed. The location of ventricular arrhythmias points to the right coronary artery. By correlating clinical judgement with these data, severe underlying coronary artery disease was suspected and subsequently confirmed by coronary angiography, which showed triple vessels disease with a 50% stenosis of the left main due to the chronic lesions. The following question was asked: should the patient benefit from PCI or CABG?

Conclusions: Although heart ischemia can embody a large spectrum of clinical (excluding angina) and paraclinical manifestations, heart arrhythmias often accompany or expose underlying coronary artery disease. It is fundamental for the clinician to understand the substrate and the site of arrhythmias in order to appropriately assess and solve the medical puzzle.

3.7. Cognitive Training with Double Tasks to Prevent Cognitive Decline After Coronary Artery Bypass Grafting

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Background: The aim of this paper is to assess cognitive parameters in coronary artery bypass grafting (CABG) patients using cognitive training with double tasks.

Methods. This prospective randomized study included 62 patients aged 64 [60; 72] years old. One group received cognitive training ($n = 29$) and another group went without training ($n = 33$), and they were compared in terms of the clinical characteristics. The median score according to the MoCA was 24 [22.0; 27.0], which indicates the presence of mild cognitive impairment. An assessment of psychomotor and executive functioning,

attention, and short-term memory was carried out 2–3 days before the operation and 11–12 days after CABG. The threshold for deterioration in the test scores was 20%. The mean duration of cardiopulmonary bypass was 77.0 [60.0; 94.0] min, and the surgery duration was 180.0 [160.0; 210.0] min.

The patients were given a daily course (5–7 days) of computer cognitive exercises featuring tasks on visual motor reaction and the simultaneous execution of one of the other tasks (naming items with a certain letter, verbal counter counting, and naming objects that begin with a certain letter).

Results: The results of the cognitive tests before surgery showed no intergroup differences. In total, a 20% reduction was found in the postoperative tests: evaluations of psychomotor and executive functions revealed an increase in missed signals in 21% of patients who underwent training and in 30% who did not undergo training ($p = 0.05$); we also observed increased errors in 6.9% of patients who underwent training and 15.2% who did not ($p = 0.02$). In the Burdon test, the performance index deteriorated in 14% of patients in the training group and in 24% who did not undergo training ($p = 0.04$). Short-term memory was worse in 14% of patients who underwent the cognitive learning tasks and in 27% who did not ($p = 0.03$).

Conclusion: The results of cognitive training demonstrated a reduction in the severity of cognitive disorders after coronary bypass.

3.8. Deaths from Acute Myocardial Infarction: A Comparative Analysis of the Past Decade in Brazil

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Introduction: According to the World Health Organization, cardiovascular diseases are the leading cause of death globally, accounting for 31% of all deaths worldwide in 2016. In Brazil, acute myocardial infarction stands out as the leading cause of mortality among cardiac pathologies in the country. Thus, it is crucial to identify the epidemiological profile of deaths to diagnose the challenges faced by the Brazilian healthcare system and to target public health measures toward the groups most affected by this condition. **Methods:** A cross-sectional, descriptive, and retrospective study was conducted on deaths caused by acute myocardial infarction between January 2014 and December 2023 in Brazil. Secondary data were collected from the Department of Information and Informatics of the Unified Health System. **Results:** Between 2014 and 2023, 931,983 deaths from acute myocardial infarction were recorded in Brazil, with an average of 93,198.3 deaths per year and minimal fluctuation in annual mortality rates. The most affected age group was 80 years and older, accounting for 26.74% of total deaths. Men were 145% more affected than women, while the most vulnerable population groups were White and Brown individuals, representing 51.84% and 37.03% of deaths, respectively. Additionally, approximately 50% of deaths occurred in hospital settings. **Conclusions:** A high number of deaths from acute myocardial infarction has been observed in the past decade in Brazil. The annual average number of deaths, combined with the low fluctuation in mortality rates over the years, and the prevalence of hospital-based deaths, indicates significant public health challenges in addressing the high mortality associated with this condition. Furthermore, the epidemiological profile of patients—elderly White or Brown men aged 80 years or older—highlights the most vulnerable group to acute myocardial infarction. It is therefore of utmost importance to direct collective health measures toward this population group.

3.9. Direct Oral Anticoagulant Therapy in Atrial Fibrillation > 65 Years Old

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Direct Oral Anticoagulants (DOACs) are generally preferred for stroke prevention in non-valvular atrial fibrillation (AF), particularly in patients >65 years old who are at higher risk of thromboembolic events and bleeding complications. DOACs offer efficacy comparable to warfarin, with a better safety profile and fewer dietary interactions, making them suitable for elderly patients. However, challenges remain in patients with renal impairment, polypharmacy, poor nutrition, or elevated bleeding risk.

An audit at Derriford Hospital, United Kingdom, evaluated DOAC prescriptions for stroke and systemic embolism prophylaxis in patients >65 years old with non-valvular AF. It aimed to ensure alignment with current national guidelines, hence optimizing outcomes by minimizing thromboembolic risk and dosing-related adverse effects. Data from electronic patient records over a two-week period showed that, of the 235 patients reviewed, 51 had AF, with 49 prescribed a DOAC. Only 10% of DOACs were initiated during hospital stays, indicating that most were initiated pre-admission.

The DOAC distribution was apixaban (n = 21), dabigatran (n = 2), rivaroxaban (n = 10) and edoxaban (n = 16). The results showed that only 65% received the correct DOAC choice and dosage based on their clinical needs. Contributing factors included sub-therapeutic doses, clinical scenarios where apixaban should have been the preferred DOAC, and inadequate dose adjustments for weight, age, and renal function. These findings highlight the need for individualized DOAC therapy. To improve practice, a teaching session was provided to the doctors including these findings, and educational posters with key points and dosing guidelines were placed in offices. A follow-up audit conducted three months later revealed that 72.7% of patients were prescribed the correct DOAC choice and dosage across all wards. This improvement in guideline adherence highlights the importance of continued professional education, targeted interventions such as training sessions and guideline-focused resources, and regular audits in maintaining and enhancing prescribing practices within the hospital.

3.10. Extracorporeal Therapy in Critically Ill Patients: Prospects for Monitoring Aromatic and Mitochondrial Metabolites

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Introduction: Levels of sepsis-associated aromatic microbial metabolites (AMMs) of tyrosine and phenylalanine in the blood serum were demonstrated to correlate with the severity of the critical condition, particularly with the SOFA score, and the levels of some mitochondrial metabolites, reflecting the impact on mitochondrial dysfunction [DOI:10.3390/metabo9100196].

Objectives: To assess the extracorporeal detoxification effect on the AMM (including phenyllactic, 4-hydroxyphenylacetic, and 4-hydroxyphenyllactic acids) and mitochondrial metabolite (fumaric, succinic, and itaconic acids) dynamics, and their relationship with the severity assessment of intensive care patients.

Methods: Two critically ill patients (A and B) after severe injury, and patient C after complex cardiac surgery, underwent several sessions of hemodiafiltration and hemoperfu-

sion due to the development of multiple organ failure and sepsis. Metabolite concentrations in the serum samples ($n = 27$) were detected using gas chromatography–mass spectrometry.

Results: In patients A and B with septic complications on the first day, the SOFA scores were 12 and 10 points, and the AMM was 5 and 9 μM , respectively. Extracorporeal therapy was carried out over the next few days. On the 4th and 6th day for patients A and B, respectively, their condition was improved, and by the 13th and 7th day, the SOFA scores and AMM reached their minimum values (3 μM for AMM), respectively [DOI:10.1134/S106193482470117X]. Patient C developed multiple organ dysfunction and demonstrated an improvement in the SOFA score from 8 to 2 and in the AMM from 38 to 5 μM after using extracorporeal therapy over 13 days. All three patients survived. The general direction of the dynamics of the SOFA scores and the AMM and mitochondrial metabolites coincided at the same time, and the AMM positive dynamics was about one day ahead of the SOFA score for patients A and B.

Conclusion: Monitoring AMM levels may be useful for evaluating the effects of extracorporeal therapy in critically ill patients.

3.11. Paternal Teratogen Exposure and Risk of Congenital Heart Disease in Offspring: A Two-Year Retrospective Observational Study

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Introduction: Exposure to teratogens, such as alcohol, drugs, tobacco, etc., before or during pregnancy is a well-established risk factor for adverse birth outcomes, including low birth weight, preterm birth, and congenital heart disease (CHD). While maternal exposure has been extensively studied, the impact of paternal addictions on CHD risk in offspring remains underexplored, despite their potential effects on sperm quality and maternal health. This study investigates the role of paternal teratogen exposure in CHD development, with a focus on its correlation with socio-demographic and socioeconomic factors.

Methods: A retrospective case-control study was conducted on children screened for CHD during 2022–2024. Data were analyzed using SPSS and MS Excel, employing the χ^2 test, Fisher's exact test, and multivariate logistic regression.

Results: Of the 8798 children screened, 7626 (86.7%) were diagnosed with CHD, and 1172 were controls. Paternal addictions included alcohol (10.9%), chewable tobacco (18.1%), and pan-masala/supari (4.9%). Alcohol consumption, prevalent in northeast India ($p = 0.055$; OR = 3.92) and among nuclear families ($p < 0.001$; OR = 1.76) in urban areas ($p < 0.001$; OR = 1.54), was linked to a reduced risk of total anomalous pulmonary venous connection [$p = 0.03$; OR (95% CI) = 0.55 (0.32–0.94)]. Tobacco and pan-masala consumption was associated with nearly double the risk of cyanotic CHD ($p < 0.001$) and complex CHD manifestations ($p < 0.05$), particularly in families from eastern and central India ($p < 0.05$) with low socioeconomic status ($p = 0.04$; OR = 19.43), and contributed to low birth weight ($p = 0.003$; OR = 1.25).

Conclusion: Our study highlights the significant role of paternal addiction in CHD prognosis, revealing critical socioeconomic and regional risk factors. It underscores the need for targeted preventive strategies, and further research on paternal teratogen exposure and its impact on offspring health.

3.12. Raynaud's Phenomenon-Associated Severe Hand Ischemia and Gangrene Salvaged with Concurrent Brachial–Radial–Ulnar Double Bypasses and a Multimodal Approach

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Introduction: Raynaud's phenomenon (RP) is a vascular disorder characterized by episodic vasospastic attacks, often triggered by cold or stress. In vasospastic disorders such as RP, occurrences of gangrenous changes in the fingers are exceedingly rare. Standard treatments for RP include lifestyle adjustments and a variety of medication regimens, yet, in severe cases involving digital ischemia and gangrene, RP management still remains without consensus. This report discusses a case of severe RP treated with a novel surgical approach after conventional therapies and surgical approaches failed.

Case Presentation: We describe a 47-year-old female with RP presenting with severe gangrene in the third finger. In this patient, medical management of RP, including initial treatments of lifestyle modifications and medications, failed to provide relief. When these conservative therapies proved ineffective, the decision was made to perform a brachial–radial–ulnar arterial thromboembolectomy. However, follow-up duplex ultrasounds showed velocities that were less than ideal despite the open radial and ulnar arteries, and the patient showed early signs of returning symptoms. Thus, the decision was made to perform a subsequent brachial–radial–ulnar double-bypass procedure, a unique surgical approach to RP. This surgical intervention successfully restored adequate perfusion, leading to complete recovery. Postoperatively, the patient demonstrated significant improvement, maintaining patent bypass and resuming normal activities supported by several years of a follow-up post-procedure.

Discussion: This case highlights a complex RP presentation resistant to conventional therapies, necessitating surgical intervention. When thromboembolectomy was not sufficient, the dual-bypass strategy offered a unique solution by providing redundancy in blood supply, which was critical for hand function preservation. Yet, arterial bypasses remain infrequently documented in the literature as treatment options for RP, which are typically reserved for critical limb ischemia and other vascular diseases. This report emphasizes the importance of the consideration for surgical bypass in managing severe RP, underscoring the need for individualized treatment strategies and tailored interventions in severe RP cases.

3.13. Silent Heart Changes: Late Detection of a Rare Heart Condition

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Introduction: Left ventricular hypertrabeculation, also known as left ventricular non-compaction cardiomyopathy, is a rare myocardial condition characterized by deep trabeculations with implications for cardiac function.

Method: The aim of this clinical case is to highlight the late diagnosis of left ventricular hypertrabeculation in a patient with non-specific symptoms, emphasizing the importance of continuous monitoring and advanced imaging evaluations for early detection of the disease. The patient, a 47-year-old woman, without any important medical history or cardiac risk factors, presented with fatigue, dyspnea during mild exertion, dizziness, and palpitations. The patient's SCORE2 score was 3.3%.

Results: After a routine clinical examination, which showed cardiomegaly, the electrocardiogram revealed a rightward electrical axis with frequent ventricular extrasystoles showing severity criteria (R/T phenomena), QR morphologies in V1 and V2, and fragmented complexes in aVR. Ventricular monomorphic ectopic beats were frequently recorded on 24-h ECG Holter monitoring. Suspecting cardiomyopathy, transthoracic echocardiography identified biventricular dilation and visible trabecular formations along the lateral and apical walls, moving synchronously with the myocardium, with blood flow detected in the intratrabecular spaces on Color Doppler, as well as left ventricular systolic dysfunction. The suspicion of left ventricular hypertrabeculation (previously known as non-compaction cardiomyopathy) was confirmed by cardiac magnetic resonance imaging. Under the specific four pillars of heart failure treatment, the evolution was good. In addition, antiarrhythmic treatment with amiodarone was initiated.

Conclusion: This case underscores the diagnostic challenges posed by left ventricular hypertrabeculation and underscores the value of integrating clinical findings with advanced imaging techniques. Early identification and appropriate management of this rare condition are essential to prevent disease progression and improve patient outcomes.

3.14. *Sometimes, Two Cardiac Pathologies Are Better than One*

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Introduction: Eisenmenger syndrome is a severe complication of adult congenital heart defects, particularly those involving communication between the heart chambers or large vessels, and typically develops between 20 and 30 years old if the defect remains untreated.

Methods: We present the case of a 47-year-old patient, a smoker, a chronic ethanol abuser, hypertensive, and non-compliant to therapy, arriving at the emergency room due to right anterior epistaxis and symptomatic elevated blood pressure values (220/120 mm Hg). The patient stated that he had noticed the presence of low exercise tolerance over time, but he was not evaluated by a cardiologist. The emergency FoCUS echocardiographic examination performed in the emergency room apparently showed a hypertensive heart.

Results: After the correction of his high blood pressure, the patient was hospitalized. On clinical examination, the detection of a loud systolic murmur in all auscultation points and his ECG result (a right hyperdeviated electrical axis and the criteria for biventricular hypertrophy) led to the standard transthoracic echocardiographic re-evaluation. It showed severe left and right ventricle hypertrophy, a very small right ventricle cavity, and a membranous ventricular septal defect (with an 8 mm left-to-right shunt). No significant anomalies of the aortic and pulmonary valves were detected. The results lead to several questions. Is the right ventricle hypertrophy secondary? Why is the interventricular shunt still left-right at his age and in spite of arterial hypertension and the large ventricular septal defect? Why has he not developed Eisenmenger syndrome? Why is there severe biventricular hypertrophy? Is there associated hypertrophic cardiomyopathy?

Conclusions: The imaging data provided by standardized transthoracic echocardiography require the addition of other imaging and paraclinical methods for an integrated, multimodality imaging diagnosis. In echocardiography, the detection of one congenital heart disease obliges us to search for a second. Sometimes, two cardiac pathologies are better than one.

4. Oral Diseases

4.1. Hyperbaric Oxygen Therapy to Enhance Functional Recovery in Bell's Palsy: A Case Series

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Introduction: Bell's palsy is a neurological disorder characterized by sudden unilateral facial paralysis, primarily affecting individuals aged 15 to 40, with a lifetime risk of approximately 1 in 60. Symptoms include facial weakness, pain around the ear, and altered taste, often resulting from herpes simplex virus reactivation. Around one-third of patients may experience incomplete recovery, leading to long-term complications such as synkinesis and facial asymmetry. This study investigates the efficacy of hyperbaric oxygen therapy (HBOT) as an adjunct treatment alongside corticosteroids in enhancing recovery outcomes in patients with moderate-to-severe Bell's palsy.

Methods: The case series included four patients (n = 4) with moderate-to-severe Bell's palsy, each initially assessed using the House–Brackmann (HB) scale. Treatment involved corticosteroids (Prednisolone 60 mg daily for five days, followed by tapering) and antiviral medications (Valacyclovir 1 g three times daily for 5–7 days), combined with daily HBOT sessions at 2.0 to 2.5 ATA for 90 min. Vital signs were monitored throughout the treatment.

Results: The results indicated improvements in facial nerve function, measured using the HB scale. Specifically, patient scores improved from an initial range of 3 to 5 over treatment durations of 5 to 11 days. The average improvement across the four patients was 1.5 HB grades, with greater benefits observed in the patient with a higher initial score.

Discussion: The findings suggest that combining corticosteroids, antivirals, and HBOT can significantly enhance the recovery from Bell's palsy. The most significant improvement was noted in the patient with severe initial dysfunction (HB score of 5), indicating that HBOT may be particularly beneficial in severe dysfunction.

Conclusion: The combination of corticosteroids, antiviral therapy, and HBOT appears promising in accelerating the recovery from Bell's palsy, warranting further investigation through large multicentric controlled trials to establish HBOT as a standard adjunct therapy in clinical practice.

4.2. Peri-Implantitis Management: A Case Report

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Introduction: Peri-implantitis is a pathological condition that occurs in the tissues surrounding dental implants, characterized by inflammation and progressive resorption of the supporting bone. The diagnosis of peri-implantitis is established through clinical evaluation, characterized by periodontal probing of >3 mm, bleeding on probing, and suppuration, combined with radiological evidence. The current literature outlines two main therapeutic approaches—non-surgical techniques and surgical techniques—which can be further divided into regenerative and resective treatments. The aim of this report is to present a clinical case regarding the surgical management of peri-implantitis, focusing on the correction of the hard and soft tissue.

Methods: The patient came to our attention referring to painful symptoms, with edema and gingival hypertrophy. Following a clinical evaluation, an 8 mm probing depth corresponding to the implant in the #2.5 area was found, leading to a diagnosis of peri-implantitis. After local anesthesia, the opening of a full-thickness flap was performed, followed by the removal of the inflammatory tissue. Deproteinized bovine bone and collagen membrane were used for the graft to achieve regeneration of the hard tissues. A connective tissue graft was harvested from the palate in order to regenerate the soft tissue as well. A 5/0 Vicryl suture was performed in the region of interest, ensuring flap repositioning with graft stabilization.

Results: The patient underwent clinical and radiographical follow-up at 60 and 120 days after surgery, which highlighted their complete healing with correction of the hard and soft tissues in the treated area.

Conclusions: The current literature describes different therapy strategies for peri-implantitis. Recent research emphasizes the value of a regenerative technique that restores both the hard and soft tissue's integrity. A surgical approach with a regenerative technique, due to the improvement of the peri-implant tissue conditions, ensures an enhancement in long-term stability and functional outcomes.

4.3. Space Gaining for Maxillary Canines with Orthopedic Appliances: A Case Report

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Introduction: The success of a restorative treatment is closely linked to the degree of surface polishing, which can prevent issues such as secondary caries, discoloration, microleakage, and fractures. The choice of finishing and polishing techniques is essential to ensure the durability and aesthetic quality of composite resin restorations.

Objective: This study aimed to compare different finishing and polishing techniques for composite resin restorations by evaluating the resulting surface roughness.

Methods: A 24-year-old female patient presented to the Comprehensive Dentistry Clinic at UNIBRA with complaints of darkened and unsatisfactory dental restorations. The proposed treatment included the following three main stages: gingival contouring, tooth whitening, and the replacement of the restorations.

Initially, gingival contouring was performed, followed by a 21-day healing period. Tooth whitening was carried out using a combined technique with 35% hydrogen peroxide in-office and 16% carbamide peroxide at home. After whitening, the restorations of teeth 11 and 21 were replaced using specific procedures, including preparation, shade selection, adhesive application, resin layering, occlusal adjustment, and finishing and polishing.

Results: The multidisciplinary treatment significantly improved the patient's smile aesthetics. Gingival contouring achieved a harmonious gingival margin, tooth whitening delivered the desired brightness, and the new composite resin restorations provided a more natural and satisfactory appearance in terms of color and shape.

Conclusions: The multidisciplinary approach was essential for the aesthetic harmonization of the patient's smile, resulting in an outcome that was satisfactory for both the patient and the professionals involved. The integrated treatment contributed to the patient's well-being and underscored the importance of combined techniques to achieve high-quality aesthetic results.

4.4. The Nd:Yag Laser in the Treatment of Gingival Hypertrophy: A Case Report

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Introduction: The laser-assisted new attachment procedure (LANAP) protocol, leveraging the advanced capabilities of the Nd:YAG laser, is driving a paradigm shift in periodontal treatment, transitioning from traditional resective approaches to regenerative and reconstructive procedures. The aim of this report is to present a clinical case demonstrating the use of the Nd:YAG laser (1064 nm) as an adjunct to full-mouth disinfection in the management of drug-induced gingival hypertrophy.

Methods: A 50-year-old male patient with amlodipine-related gingival hypertrophy presented to our clinic. A thorough periodontal evaluation was performed, including radiographic examinations and the completion of a periodontal chart. One month after drug replacement, supragingival and subgingival scaling and root planning, oral hygiene instructions, and chlorhexidine 0.20% rinses were continued. Finally, two sessions of Nd:YAG laser-assisted curettage were performed, spaced 40 days apart.

Results: The patient showed a continuous reduction in hypertrophy and pseudo-gingival pockets over time, until a normally colored gingiva with an absence of bleeding and further classic signs of inflammation was achieved.

Conclusions: Nd:YAG laser fiber optics, when introduced into the gingival pseudo-pockets, is effective in disintegrating periodontopathogen bacteria and sulcular debridement, demonstrating promising short-term benefits for patients with gingival hypertrophy. This technique should be considered as a complementary therapy, not a replacement, for traditional root scaling and root planing techniques, allowing for the avoidance of resective surgical techniques conventionally used in cases of gingival hypertrophy.

5. Orthopedic Surgery

5.1. Improving Bone Protection Provision for Patients with Fragility Fractures

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Introduction: The NICE guidelines recommend that patients ≥ 75 years old who have sustained a fragility fracture receive osteoporosis therapy, such as bisphosphonates, alongside appropriate calcium and vitamin D supplementation. Such patients form a major component of orthopedic inpatients; thus, a QIP was undertaken to review and improve bone protection practice at Buckinghamshire Healthcare NHS Trust.

Methods: From August 2023 to May 2024, a full-loop audit cycle was conducted pre- and post-implementation of a simple checklist, which was incorporated within patient notes to guide ward clinicians safely through osteoporosis treatment. This QIP utilized a cogent PDSA structure and effective stakeholder involvement.

Results: A total of 133 suitable patients were identified in the first cycle, and 83 in the second. When the checklist was utilized, all of the patients had a senior clinician-led bone protection plan put in place, with a significant 37% increase ($p = 0.00006$) compared to pre-implementation. Amongst these, there was a significant 20% increase ($p = 0.018$) in inpatient provision of planned osteoporosis medication, the elimination of unsafe prescriptions that did not check adequate renal function or blood calcium levels, and a significant improvement in correct vitamin D replacement by 30% ($p = 0.0004$). The checklist did not have a significant effect on the timeliness of bone protection provision, likely due to the wider multifactorial picture of a very busy orthopedic team caring for unstable, comorbid patients peri-operatively. However, the communication of correct information on discharge to primary care physicians was significantly ameliorated by 27% ($p = 0.006$), thus hopefully enhancing the continuity of osteoporosis care in the community. Furthermore, feedback

surveys from the multidisciplinary team also showed that the checklist intervention was well received, easy to use, and educational.

Conclusions: A simple single-page checklist demonstrably improved the safe provision of bone protection medication for patients with fragility fractures. Hopefully, this will encourage other clinical teams caring for orthogeriatric patients to evaluate their osteoporosis practice and deploy a similar QI strategy.

5.2. Biohydrogels with Adaptogens: Advancing Chronic Wound Healing in Orthopedic Surgery

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Introduction: Chronic wounds pose significant challenges in clinical practice, particularly in orthopedic surgery, where tissue repair is crucial for recovery. Biohydrogels enriched with adaptogens, natural compounds known for their stress-modulating and regenerative properties, offer a novel approach to enhancing wound healing. This study explores the development and application of biohydrogels containing adaptogens for innovative therapies targeting chronic wounds.

Methods: Biohydrogels were synthesized using natural and synthetic polymers, including alginate (3% *w/v*) and polyvinyl alcohol (10% *w/v*), enriched with adaptogens such as ginseng extract (from 1% to 5% *w/v*) and ashwagandha (from 1% to 5% *w/v*). We characterized properties including the mechanical strength, swelling ratio (from 180% to 380%), and biodegradation. In vitro studies evaluated the biocompatibility and the effect of adaptogens on fibroblast proliferation (viability >92% after 7 days ($p < 0.05$)) and collagen synthesis. The hydrogels were further tested for their antimicrobial properties and ability to support tissue regeneration in chronic wound models.

Results: The biohydrogels demonstrated excellent water retention and mechanical stability, suitable for prolonged wound coverage. Adaptogen-enriched hydrogels significantly enhanced the fibroblast proliferation and collagen deposition compared to the control hydrogels. Antimicrobial tests confirmed reduced bacterial growth, creating a favorable environment for healing. The preliminary in vivo models indicated accelerated wound closure and reduced inflammation in chronic wound conditions.

Conclusions: Biohydrogels containing adaptogens represent an innovative therapeutic option for chronic wound management in orthopedic surgery and beyond. Their unique properties, combining an enhanced regenerative capacity with antimicrobial effects, make them a promising solution for improving patient outcomes.

Acknowledgments: This project was financed with funds from the state budget granted by the Minister of Science within the framework of the “Student Scientific Clubs Create Innovations” (SKN/SP/601893/2024) “Application of Biohydrogels Containing Adaptogens in Innovative Chronic Wound Therapy”. This research was carried out within the SMART-MAT Functional Materials Science Club (section Smart-Mat) at the Faculty of Materials Engineering and Physics of the Cracow University of Technology.

5.3. Epidemiological Analysis of Hospitalizations Due to Femur Fracture: A Study of the Last 10 Years of Brazilian Hospitalizations

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Introduction: It is estimated that 6.3 million femur fractures (FFs) a year will occur worldwide by 2050. This stipulation is alarming for the field of orthopedic surgery, since treatment often suggests surgical correction. Therefore, it is important to understand the epidemiological distribution of this condition to know how to deal with it efficiently. **Methods:** This study performed a descriptive cross-sectional study using secondary data from the DATASUS platform of the Brazilian Ministry of Health. The data refer to the Brazilian population between 2013 and 2023, and the number of hospitalizations, age group, and sex were analyzed as variables. **Results:** Over the decade analyzed, a total of 1,161,022 hospitalizations due to FF were observed. Among the distribution by age groups, the following four groups stood out the most: 80 years or older, with 309,632 hospitalizations; 70 to 79 years, with 207,009 hospitalizations; 20 to 29 years, with 132,435 hospitalizations; 60 to 69 years, with 131,770 hospitalizations. The other age groups presented absolute numbers below 100,000 hospitalizations. Between the ages of 0 and 59 years, there was a male prevalence of cases (73.69%), while, among people aged 60 years or older, there was a female prevalence (68.17%). **Conclusions:** Notably, there was a difference between the number of hospitalizations according to the age and sex of the population. Regarding age, the results are in agreement with the current literature, which describes that elderly people are more prone to FFs, often as a secondary consequence leading to bone fragility. Regarding gender, it is described in the literature that women are more likely to be affected by FFs, expressing a total number 2.17 times higher than men. Therefore, the need for approaches that pay attention to this population profile is evident, as well the production of new studies around the subject.

5.4. Functional Hydrogels Fabricated Using 4D Printing for Advanced Orthopedic Applications

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Introduction: Regenerative medicine in orthopedic surgery demands advanced materials capable of mimicking the dynamic properties of native tissues. Hydrogels based on collagen, a natural extracellular matrix component, and polyvinylpyrrolidone (PVP), a versatile synthetic polymer, provide a unique combination of biocompatibility and mechanical stability. This project focuses on developing functional hydrogels using 4D printing technology to address the challenges of tissue repair in orthopedic applications.

Methods: Collagen–PVP hydrogels were synthesized using collagen (5% *w/v*) and PVP (10% *w/v*) to form a hybrid polymer network with tunable mechanical and biological

properties. Scaffolds were fabricated using 4D printing, enabling stimuli-responsive behaviors, such as shape memory and swelling. Mechanical testing revealed a compression modulus, and the swelling capacity reached from $150 \pm 25\%$ to $375 \pm 25\%$ in physiological conditions. Biodegradation analysis indicated a 15% mass loss over 30 days. Cellular studies using osteoblasts and chondrocytes assessed the biocompatibility ($>90\%$ cell viability after 7 days) and differentiation.

Results: The collagen–PVP hydrogels demonstrated excellent mechanical strength and elasticity, suitable for load-bearing orthopedic applications. The 4D-printed scaffolds exhibited dynamic shape adaptation in response to temperature and hydration changes. Cellular studies confirmed the high biocompatibility, with a significant proliferation and differentiation of osteoblasts and chondrocytes. The hybrid hydrogels also showed controlled degradation profiles, aligning with tissue healing timelines.

Conclusions: Collagen–PVP hydrogels fabricated using 4D printing represent a promising solution for orthopedic regenerative applications. Their combination of adaptability, biocompatibility, and mechanical performance positions them as advanced materials for cartilage and bone repair. Further studies will focus on in vivo evaluations and the integration of bioactive agents to enhance therapeutic outcomes.

Acknowledgments: This research was carried out within the SMART-MAT Functional Materials Scientific Club of the Faculty of Materials Engineering and Physics at Cracow University of Technology, and as part of the project entitled “Functional Hydrogels Fabricated Using 4D Printing” financed by the FutureLab organization operating at Cracow University of Technology.

5.5. The Role of Physiotherapy in Managing Rotator Cuff Tendinopathy: Eccentric Strengthening and Acromioclavicular Joint Mobilization as Effective Interventions in a Case Study

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Background: Degeneration with continuous mechanical load on the shoulder leads to inflammation and vascular disruption of the rotator cuff tendons. With eccentric strengthening, a sufficient load is placed on the inflamed tendon, re-initiating collagen remodeling and neo-vascularization, while mobilization will correct the positional faults and improve joint play. With these benefits in consideration, determining whether a combination of eccentric strengthening and acromioclavicular joint mobilization can further help in pain reduction and improve function is the purpose of the present case study.

Methods: A case of a 60-year-old female with recurrent rotator cuff tendinopathy presented with the complains of right shoulder pain associated with difficulty in overhead functional activities, painful shoulder flexion, abduction, and external rotation. The outcome measures taken were pain intensity as measured using the Numerical Pain Rating Score, shoulder pain measured on a Universal Goniometer, and shoulder disability measured using the Shoulder Pain and Disability Index score. Eccentric strengthening exercises involving the rotator cuff muscle were given along with acromioclavicular joint grade 1 mobilization and scapula retraction exercises for 3 weeks, 5 days per week.

Results: The pain intensity reduced from 6/10 to 2/10 post-treatment, as measured on the NPRS. The shoulder flexion, abduction, and external rotation ranges improved from 80° , 80° , and 70° to 100° , 95° , and 80° , respectively. The pre-measurement of shoulder disability on the SPADI was 86/130, which reduced to 51/130 post-treatment.

Conclusion: Acromioclavicular joint grade 1 mobilization combined with eccentric strengthening of the rotator cuff muscle is effective in reducing pain, improving shoulder ROM, and reducing shoulder disability.

5.6. *Advancements in Nanotechnology for Orthopedic Applications: A Comprehensive Overview of Nanomaterials in Bone Tissue Engineering and Implant Innovation*

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Orthopedic implant technology has historically seen difficulties in attaining long-term stability and biological integration, leading to complications such as implant loosening, wear debris production, and heightened infection risk. Nanotechnology provides a revolutionary method for addressing these constraints through the introduction of materials characterized by exceptional biocompatibility, durability, and integration potential. Nanomaterials, characterized by distinctive surface topographies and elevated surface area-to-volume ratios, facilitate improved osseointegration and provide regulated medication release, thereby creating a localized therapeutic milieu surrounding the implant site. To overcome the long-standing constraints of conventional implants, such as poor osseointegration, low mechanical fixation, immunological rejection, and implant-related infections, nanotechnology is causing a revolution in the field of orthopedic research. Nanomaterials are ideally suited for orthopedic applications due to their exceptional features, including increased tribology, wear resistance, prolonged drug administration, and excellent tissue regeneration. Because of their nanoscale size, they can imitate the hierarchical structure of real bone, which, in turn, encourages the proliferation of cells, lowers the risk of infection, and helps with the mending of bone fractures. This article will investigate the wide-ranging possibilities of nanostructured ceramics, polymers, metals, and carbon materials in bone tissue engineering, diagnostics, and the treatment of implant-related infections, bone malignancies, and bone healing. In addition, this paper will provide a basic overview of the most recent discoveries in nanotechnology driving the future of translational orthopedic research. It will also highlight safety evaluations and regulatory requirements for orthopedic devices.

5.7. *Physiotherapeutic Intervention for Acetabular Fracture in a 60-Year-Old Male: A Case Report*

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Acetabular fracture is a challenging and uncommon fracture for radiologists and orthopedics. The prevalence rate for young patients is 80% in road traffic accidents, with an incidence of 3 patients/100,000/year. This case report showcases the recovery of 60-year-old male farmer by occupation suffering from acetabular fracture following a history of a road traffic accident, and a medical history of diabetes following open reduction internal fixation with an acetabular plate and screw. The patient underwent a structured physiotherapy exercise protocol for 2 weeks. On examination, the active range of motion of the affected side hip flexion was 10 degrees and that of hip abduction was 20 degrees, while that of knee flexion was 20 degrees in the supine position. The range of motion of the affected side ankle was in a normal, functional range of motion. This was assessed using a goniometer. Pain was assessed using a numerical pain rating scale, where the patient rated 4 out of 10 during movement and 1 out of 10 at rest.

Furthermore, 3D CT of the pelvis with both hip joints showed a comminuted displaced fracture in the posterior column of left acetabulum. Two bony fragments measuring 10×4 mm and 7×3.7 mm were noted in the left hip joint space.

The positive result of this case highlights the significance of incorporating physiotherapy into the postoperative treatment of patients with diabetes and fractures. This helps improve the functional recovery and decreases the likelihood of long-term disability.

5.8. Polymeric Hydrogels for Regenerative Medicine in Orthopedic Surgery

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Introduction: Cartilage damage, caused by injury or degenerative diseases, presents significant challenges due to the tissue's limited self-healing capacity. Polymeric hydrogels, with their biocompatibility, tunable mechanical properties, and ability to mimic the extracellular matrix, are emerging as promising materials for cartilage regeneration. This study investigates the potential of polymeric hydrogels as cartilage substitutes, emphasizing their role in supporting tissue repair and integration.

Methods: Biodegradable hydrogels were synthesized using alginate (2% *w/v*) and PVA (10% *w/v*), with 5% (*w/v*) calcium phosphate nanoparticles to enhance the bioactivity. The hydrogels were characterized for their mechanical strength, swelling ratio ($250 \pm 15\%$), and degradation (15% mass loss in 30 days). In vitro studies using chondrocyte cultures assessed the cell viability (>90% after 7 days) and extracellular matrix production. Further, 3D printing was employed to fabricate patient-specific hydrogel scaffolds with a porosity of $300 \pm 20 \mu\text{m}$ to mimic native cartilage architecture.

Results: The hydrogels exhibited mechanical properties similar to natural cartilage, with controlled swelling and degradation suitable for integration into damaged tissues. The 3D-printed scaffolds demonstrated a consistent geometry, promoting nutrient diffusion and matrix deposition.

Conclusions: Polymeric hydrogels represent a promising solution for cartilage regeneration, offering mechanical and biological properties that support tissue repair. Their adaptability to 3D printing enables personalized approaches, highlighting their potential for clinical applications in treating cartilage defects.

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