but lacks unequivocal evidence of invasion, such as invasion to peritumoral vessels, perineural invasion and surrounding structures.

Methods: A retrospective study of 15 consecutive patients with atypical parathyroid adenoma treated at a single center between 2010 and 2020 was performed. Patient demographics, clinical characteristics, biochemical profile, indications for surgery, preoperative localization studies, intraoperative findings, histopathological characteristics, disease recurrence or persistence and survival were collected.

Results: 7 of 15 were female with a median age of 62 (IQR: 52–67). Five of the 15 patients (33%) were re-operative. No patients presented with palpable neck mass. Presentations were consistent with usual primary hyperparathyroidism. Average calcium on presentation was 11.2, and average PTH was 199. One patient had known MEN1 syndrome and one patient had family history of hyperparathyroidism but had negative genetic testing. Most patients 12/15 had correctly localizing imaging pre-operatively with the other 3 having equivocal or non-localizing studies. Two patients did not have biochemical resolution of hyperparathyroidism, both were re-operative. Of the patients with biochemical cure, 6 did not have follow up beyond 6 months, and 7 patients had long term follow up with persistent biochemical resolution and no recurrence of disease for a median of 4 years (IQR: 3.75–9.25). On review of pathology, no patients had invasive features and all patients had presence of thick fibrous bands or capsule.

Conclusion: Patients with atypical adenoma have good response to surgery and low recurrence rates. Reoperation with associated scarring and fibrous bands can confound pathological findings. Our experience shows that patients found to have atypical parathyroid adenoma at their primary operation with resulting biochemical cure can be followed long-term with seemingly indolent and nonaggressive behavior.

Bone and Mineral Metabolism

PARATHYROID AND RARE BONE DISORDERS

Clinical Burden and Practice Patterns in Patients With Chronic Hypoparathyroidism in the United States (US): A Claims Data Analysis Using Diagnosis-Based Criteria

Dolly Sharma, PhD[1], Kathleen L. Deering, Pharm D[1], Patrick Loustau, MS, MA[2], Michael D. Culler, PhD[2], Soraya Allas, MD, PhD[3], Blandine Weiss, Pharm D, MS[2], Deborah M. Mitchell, MD[4], Danette Astolfi, MBA[5], Michael Mannstadt, MD[4].

[1]EPI-Q Inc., Oak Brook, IL, USA, [2]Amolyt Pharma, Cambridge, MA, USA, [3]Amolyt Pharma, Ecully, France, [4]Endocrine Unit, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA, [5]Hypoparathyroid Association Representative, Wescosville, PA, USA.

Objectives: Significant knowledge gaps exist regarding the comorbidities, treatment and lab testing patterns of patients with chronic hypoparathyroidism (cHP). This study describes a large cohort of patients with cHP identified using a diagnosis-based criteria from a claims database.

Methods: This retrospective cohort study was conducted using a large (130 million individuals) claims database (HealthVerity Closed Payer Claim Medical and Pharmacy databases: Private Source 20) from Oct 2014 to Dec 2019. Eligible patients had ≥2 diagnosis claims of HP (ICD9/10 codes: E20.0, E20.8, E20.9, 252.1) that were 6–15 months apart, a prescription claim for either active vitamin D, calcium, PTH or thyroid replacement therapy between the first qualifying HP claim and within 30 days of the second HP claim, and continuous enrollment for one year before the index date (the date of the first of two qualifying HP diagnosis claims) and ≥16 months after. Patients were followed up to two years after the index date. Patient characteristics, comorbidities, lab testing and treatment patterns were descriptively analyzed.

Results: Out of 43,640 patients with a diagnosis claim for HP, 4,118 patients met the eligibility criteria. The mean age of the cohort was 56.5 years + 18.6 (SD), and 76.4% were females, similar to data from other large cohort studies. The most common comorbidities during the 1-year follow-up were hypertension (56.0%), hypocalcemia (38.7%), cancer (30.5%, of which 24% were thyroid cancers), diabetes (29.4%), chronic pulmonary disease (24.1%), cardiac arrhythmias (17.4%), CKD stage 3–5 (17.0%), osteoporosis (9.6%) and neuropsychiatric disorders, including depressive disorders (22.0%), anxiety (21.6%), and sleep-wake disorders (18.4%). During the 1-year follow up, commonly monitored lab tests included serum calcium (89.9%), eGFR/creatinine (85.7%), 25-hydroxy vitamin D (61.1%), and intact PTH (43.9%). Remarkably, serum phosphorous (36.3%), serum magnesium (35.4%), and 24h-urine calcium (10.5%) were much less often monitored. In addition, BMD was measured in 10.9% patients. Also during the 1-year follow-up, 67.1% of patients had a prescription claim for thyroid replacement therapy, 60.5% for calcitriol, 15.7% for ergocalciferol, and 3.4 % for PTH.

Conclusion: Findings from this study highlight the high comorbidity burden in cHP patients which aligns with the monitoring patterns. Kidney function appears to be a key concern and may be important when considering therapeutic intervention. The comorbidities and practice patterns observed in this study are consistent with the results obtained using a surgery-based approach to identify cHP patients in the same claims database. Future studies will also examine the economic burden of cHP.

Bone and Mineral Metabolism

PARATHYROID AND RARE BONE DISORDERS

Clinical Burden and Practice Patterns in Patients With Chronic Hypoparathyroidism in the United States (US): A Claims Data Analysis Using Surgery-Based Criteria

Dolly Sharma, PhD[1], Kathleen L. Deering, Pharm D[1], Patrick Loustau, MBA[2], Michael D. Culler, PhD[2], Soraya Allas, MD, PhD[3], Blandine Weiss, Pharm D, MS[2], Deborah M. Mitchell, MD[4], Danette Astolfi, MBA[5], Michael Mannstadt, MD[4].

[1]EPI-Q Inc., Oak Brook, IL, USA, [2]Amolyt Pharma, Cambridge, MA, USA, [3]Amolyt Pharma, Ecully, France, [4]Endocrine Unit, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA, [5]Hypoparathyroid Association Representative, Wescosville, PA, USA.

Objectives: Significant knowledge gaps exist regarding the clinical burden and practice patterns associated with chronic hypoparathyroidism (cHP). This study assessed the clinical burden and practice patterns in patients with cHP identified using surgery-based criteria.
Methods: This retrospective cohort study was conducted using a large (130 million individuals) US claims database, the HealthVerity Closed Payer Claim Medical and Pharmacy database (Private Source 20) from Oct 2014 to Dec 2019. The patient eligibility criteria for the surgery-based method included the presence of a procedure claim of either parathyroidectomy, complete or partial thyroidectomy, or neck dissection, followed by a HP diagnosis claim (6–15 months apart) with a subsequent second HP diagnosis claim at any time point, and with continuous enrollment for 15 months before the index date (the date of the first qualifying HP diagnosis claim) and ≥6 months after. Patients were followed one year before the surgery and up to two years after the index date. Patient characteristics, comorbidities, laboratory testing and treatment patterns were descriptively analyzed.
Results: A total of 1,406 patients met the eligibility criteria, among which 1,184 patients had complete data for 1-year follow-up. The mean age was 52.1 + 16.4 (SD) years, and 83.2% were females. The mean time between surgery and qualifying HP diagnosis claim was 8.7 + 2.3 (SD) months, and 115 patients (8.2%) had a HP diagnosis prior to surgery. During the 1-year follow-up, the most common comorbidities were cancer (54.2%, of which 49% were thyroid cancers), hypertension (49.7%), hypocalcemia (47.1%), chronic pulmonary disease (21.9%), diabetes (21.7%), cardiac arrhythmias (18.4%), CKD stage 3–5 (11.3%), osteoporosis (9.8%), and neuropsychiatric disorders, including anxiety (23.9%), depressive disorders (21.8%), and sleep-wake disorders (20.9%). Most cHP patients were monitored for lab values. These included serum calcium (93.2%), eGFR/creatinine (86.2%), 25-Hydroxy Vitamin D (66.5%), intact PTH (63.0%), serum magnesium (40.9%), serum phosphorous (38.4%), bone mineral density (9.8%), and 24h-urine calcium (8.4%) during the 1-year follow up. Also within the 1-year follow-up, 66.9% of patients had a prescription claim for thyroid replacement therapy, 51.6% for calcitriol, 13.3% for ergocalciferol, and 5.5 % for PTH.
Conclusion: This cHP population, identified using surgery-based criteria, largely consists of patients with a recent diagnosis, and had a substantial comorbidity burden that aligned with the monitoring patterns. Already at this early stage of cHP, kidney function appears to be a key concern and may be important when considering therapeutic intervention. These data are consistent with our findings from a larger cHP population identified in the same database using a diagnosis-based approach.

Bone and Mineral Metabolism
PARATHYROID AND RARE BONE DISORDERS

Creation of an Evidence-Based Physical Therapy Program for Adults with XLH: Translational Application of an Interprofessional Clinical Study

Karthik Kanamalla, BS, Rebekah Fuchs, BS, Casey Herzog, BS, Keith Steigbigel, PT, DPT, OCS, CSCS, Carolyn Marie Macica, MS, PhD.
QUINNIPIAC UNIVERSITY, Hamden, CT, USA.

X-linked hypophosphatemia (XLH) arises due to inactivating mutations of the *PHEX* gene resulting in elevated circulating levels of the hormone FGF23, producing phosphaturia and impaired intestinal phosphate absorption. XLH is a lifelong metabolic disease with musculoskeletal comorbidities that dominate the adult clinical picture, and are resistant to standard therapies. We have previously reported the physical and functional impact of the adult disorder (J Clin Endocrinol Metab. 2020 Apr 1;105(4)). Bilateral and diffuse enthesophytes, degenerative arthritis and osteophytes were reported at the spine and synovial joints across subjects. Passive range of motion (ROM) was decreased at the spine, hips, knees, and ankles compared to controls. Gait analysis, relative to controls, revealed increased step width, markedly increased lateral trunk sway, and physical restriction at the hip, knees and ankle joints that translated into limitations through the gait cycle. These studies have been translated into an evidence-based physical therapy (PT) intervention study to address these major physical and functional comorbidities. Participants were enrolled in a remote 12-week PT program consisting of balance exercises and basic stretches with/without resistance. Subjects were evaluated at baseline and at every 4-weeks to assess ROM, gait, and functional ability. Several validated tools were employed to assess overall function: Berg Balance Scale, the Timed Up and Go (TUG) Test, and the Five Times Sit to Stand Test (5XSST). Subjective questionnaires, including the Lower Extremity Functional Scale (LEFS) and Activities-Specific Balance Confidence (ABC) Scale, were administered along with a weekly survey. At the conclusion of the study, minimal to modest improvements were seen in active ROM for the upper and lower extremity which reflect the significant bony restriction caused by XLH. However, improvements were seen in functional measures including the Berg Balance Scale, TUG, 5XSST, LEFS, and ABC. Weekly surveys indicated that participants improved their ability to balance, perform activities of daily living (ADLs), walk, and bend down to reach the ground. Results from this study will be applied to the creation of an evidence-based PT program to maintain functional capacity and improved ability to perform ADLs across the lifespan.

Bone and Mineral Metabolism
PARATHYROID AND RARE BONE DISORDERS

Disease Burden of Patients Living With Hypoparathyroidism: Results From the Voices of Hypopara Survey

Deborah Murphy, Associate Degree[1], Bob Sanders,.MS, MA[1], Loretta Gulley, BS[1], Ami Knoefler, PharmD[2], Alden Smith, PhD[2], Minyoung Park, MBA[2], Susana Tsao, MD[2], Sanchita Mourya, MD[2], Mishaela Rubin, MD[3].
[1]HypoPARAthyroidism Association, Inc, Lemoore, CA, USA, [2]Ascendis Pharma, Inc., Palo Alto, CA, USA, [3]Columbia University, New York, NY, USA.

Background: Hypoparathyroidism (HP) is a rare disease that is characterized by insufficient levels of parathyroid hormone, resulting in hypocalcemia, hyperphosphatemia and hypercalciuria. Standard of care (SoC) consists of calcium and active vitamin D supplementation. Some patients