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1

A RARE CASE OF PANCREATIC GASTROINTESTINAL STROMAL TUMOR

Chandrakala Dadeboyina, Vineela Kasireddy and Litty Thomas

Guthrie/Robert Packer Hospital Internal Medicine Residency, Sayre, PA, U.S.A.

Background: Gastrointestinal stromal tumors most commonly originate from stomach and intestine. Extra-gastrointestinal stromal tumors are rare and originate from the omentum or retroperitoneum. Extra-gastrointestinal stromal tumor of the pancreas is exceedingly rare and occurs in less than 5% of all cases and literature shows less than 30 reported cases. We hereby present a case of pancreatic gastrointestinal stromal tumor and discuss management. **Case Report:** A 58-year-old Caucasian male with past medical history of multiple sclerosis presented with generalized weakness, night sweats and cough. Computed tomography of the chest, abdomen and pelvis with intravenous contrast showed a heterogenous mass measuring 7.2×7.9×7.3 cm in the pancreatic head and no evidence of metastasis. Endoscopic ultrasound showed an irregular solid and cystic mass in the pancreatic head. Cytology revealed gastrointestinal tumor with tumor cells positive for KIT (CD 117), CD34 and BCL2 apoptosis regulator, weak focal positivity for smooth-muscle actin and desmin and negative for CK7, carcinoembryonic antigen and S100 protein. The mitotic index was less than 5/50 high-power fields. Given the large size and location of the mass, surgical and medical oncology staff felt that the patient would benefit from neoadjuvant therapy to reduce the size of the mass and increase the chance of R0 resection. The patient was started on 400 mg imatinib oral daily. Repeat biopsy showed sensitizing *KIT* exon 11 mutation, which predicts the response to imatinib. Restaging computed tomography of the abdomen and pelvis after 3 months of daily imatinib showed the mass had decreased in size to 5.3×4.8×4.7 cm. The patient tolerated imatinib with no side-effects. The plan is to follow up with surgery with possible resection as the tumor size was significantly reduced. **Conclusion:** Extra-gastrointestinal stromal tumor involving pancreas is very rare. Most tumors are incidental and may present with nonspecific symptoms of early satiety and weight loss. Differential diagnosis should consider a mass involving the head of the pancreas. Limited literature is available about the management but it is managed similar to gastrointestinal stromal tumors of the gastrointestinal tract and includes surgery, if upfront resection is possible, and adjuvant therapy with imatinib. Neoadjuvant therapy with imatinib shown to reduce the tumor size and improve survival in some reported cases.

2

ATYPICAL HEMOLYTIC UREMIC SYNDROME: A DIAGNOSTIC DILEMMA

Saira Farid, Hira Latif and Kelly Fitzpatrick

MedStar Washington Hospital Center/Georgetown University Hospital, Washington, DC, U.S.A.

Background: Atypical hemolytic uremic syndrome (aHUS) is a rare disease that is associated with high morbidity and mortality. Heterozygous mutations of complement pathway members have been associated with the onset of aHUS. A delay in diagnosis and treatment can cause devastating and irreversible renal and extra-renal complications. **Case Report:** A 31-year-old male with uncontrolled hypertension presented to another hospital with hypertensive emergency and acute renal failure and was started on emergency hemodialysis. Microangiopathic hemolytic anemia (MAHA) and thrombocytopenia (see Table I) was deemed to be secondary to hypertensive emergency. The patient's disintegrin and metalloproteinase with a thrombospondin type 1 motif, member 13 (ADAMTS13) activity was >100%. He underwent a short course of pulse steroids, which was stopped due to concerns for scleroderma renal crisis (see Table II). He underwent a renal biopsy which revealed severe arterial sclerosis and extensive global glomerulosclerosis, concerning for scleroderma *versus* atypical HUS. He was discharged on peritoneal dialysis and antihypertensives. Three months later, he presented with elevated blood pressures and inability to drain peritoneal fluid. Work-up revealed similar findings (see Table II); a blood smear revealed numerous schistocytes and rheumatological work-up revealed low positive anti-Sjögren's syndrome-related antigen A autoantibodies. Other specific

Table I. Laboratory markers. Normal levels are shown in parentheses.

Laboratory marker	July 2019	November 2019
ANA	1:320	1:160
dsDNA	Negative	Negative
Anti-SM (0-40 AU/ml)	Negative	Negative
C3 level (80-140 mg/dl)	Negative	74
C4 level (10-40 mg/dl)	Not checked	21.2
Rheumatoid factor	Negative	Negative
SSB antibody IgG/AU/ml (0-40)	Not checked	1
Scl-70 IgG/AU/ml	Not checked	5
Centromere IgG/AU/ml (0-40)	Negative	0
Anti-RNA polymerase 3/U (0-19)	Not checked	8

ANA: Antinuclear antibody; dsDNA: double-stranded deoxyribonucleic acid; anti-SM: anti-Smith; SSA RO: anti-Sjögren's syndrome-related antigen A; SSB: anti-Sjögren's syndrome type B.

Table II. Laboratory trends.

	Hemoglobin (g/dl)	Platelet count ($\times 10^3/\mu\text{l}$)	LDH (U/l)	Creatinine (mg/dl)	Bilirubin (mg/dl)
July 2019	7	88	1,289	33.8	1
On admission (Nov 2019)	6.4	24	559	30	1.1
Pre-Eculizumab	7.3	59	320	9.77	1.1
1-Week post-Eculizumab	7.6	132	287	10.8	1
4-Week post-Eculizumab	7.1	146	241	11.1	0.7

markers for scleroderma and systemic signs of the disease were absent (see Table I). Plasma exchange was initiated for Coomb's-negative MAHA. His platelet count improved to only $59 \times 10^3/\mu\text{l}$ after 4 days of plasma exchange. There was a strong suspicion of aHUS and a genetic panel was ordered. The patient was started on eculizumab after appropriate immunization, and his counts recovered within a week (see Table II). Genetic work-up revealed genetic polymorphisms of five different genes involved in the complement pathway, which confirmed the diagnosis of aHUS. *Conclusion:* Scleroderma was considered to be the culprit of renal failure and diagnosis of aHUS was delayed for months. Genetic testing should be performed and treatment should be initiated early if aHUS is suspected in order to prevent irreversible renal failure and dialysis dependence.

3 OROPHARYNGEAL CARCINOMA WITH CALVARIUM METASTASIS: A CASE REPORT

Luis F. Gonzalez Mosquera¹, Andrew Lu²
and Alida Podrumar²

¹Department of Medicine, Nassau University
Medical Center, East Meadow, NY, U.S.A.;

²Department of Hematology and Medical
Oncology, Nassau University Medical
Center, East Meadow, NY, U.S.A.

Background: Oropharyngeal carcinoma most frequently metastasizes locally to lymph nodes. Distant metastasis can occur but late and most commonly in the lung. Metastasis to other sites, such as bone, is rare. Here we present a case of recurrent temporoparietal metastasis from a squamous cell carcinoma of the oropharynx. *Case Report:* A 57-year-old male had been diagnosed with stage IVA pT4aN2cM0 carcinoma of the oropharynx, right tonsil, parapharyngeal, and right base of the tongue 4 years earlier, treated with cetuximab. He was treated before with radiotherapy for right orbital metastasis. Initial computed tomography (CT) showed: "Evidence of right temporoparietal craniectomy/craniotomy with right orbital roof resection". After a year of follow-up, a new painful nodule appeared near the surgical

area. Repeat head CT showed several enhancing masses, with bone involvement, at the peripheral aspects of the craniotomy in the right temporoparietal region, extending up to the convexity. The tumor was resected, and biopsy described a poorly differentiated carcinoma with tumor necrosis and focal squamoid differentiation. Two months later, the report of CT of the head stated: "No significant interval change in the extra-axial mass at the right frontal convexity, measuring 3.2×1.8 cm, eroding through the overlying calvarium". We started the patients with pembrolizumab and radiotherapy, with an excellent overall response. *Discussion:* Annually 5,000 new oropharyngeal carcinoma cases are diagnosed in the United States, 85-90% of which are squamous type (1). Lymph node metastasis is found in 40% of patients at presentation. Distant metastases are less common (2). In a series of 832 patients with head and neck squamous cell carcinoma, the lung was most commonly involved (80%), followed by liver, and bone (31% each) (3). Usually, the vertebra and sternum are the bones affected. The involvement of the calvarium alone is not frequent. There are few cases reported of metastasis of oropharyngeal carcinoma to calvarial bones. Most cases reported are from breast cancer. They can occur through hematogenous spread, retrograde seeding through venous plexus, or direct extension (4). Magnetic resonance imaging is the best technique for diagnosing metastases (5). In the beginning, such lesions usually present as a painless localized swelling (5). Four treatment options are used in combination or alone: Radiotherapy, chemotherapy, surgery, and endocrinology therapy. Median survival is from 9 to 11 months (5). *Conclusion:* This case reveals the importance of always considering distant metastasis as a new nodule/mass in the physical examination, no matter how rarely reported such cases are.

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4

A CASE REPORT ON RARE CAUSE OF PRIMARY HYPERPARATHYROIDISM

Sushmita Khadka, Vineela Kasireddy
and Pravash Kumar Dhakal

Guthrie Robert Packer Hospital, Sayre, PA, U.S.A.

Background: Primary hyperparathyroidism is the third most common endocrine disorder caused by autonomous production of parathyroid hormone, leading to hypercalcemia. Its prevalence is 1-7 cases/1,000 adults with female dominance (1,2). Benign adenomas constitute 80-85%, hyperplasia constitutes 10-15%, and fewer than 1% of patients have rare parathyroid carcinoma causing primary hyperparathyroidism (3, 4). Abnormalities in proto-oncogenes or tumor-suppressing genes causes parathyroid carcinoma, which might present with a familial or sporadic pattern (5). Patients have a high calcium level with non-suppressed parathyroid hormone level, 20% of patients present with symptoms of pain from osteoporotic fractures, nephrolithiasis, neuropsychiatric symptoms and constipation (6). **Case Report:** A 50-year-old female with a 20 pack-year smoking history was found to have hypercalcemia of 11 mg/dl during follow-up for sleeve gastrectomy. The patient had had borderline hypercalcemia for 1 year. The intact parathyroid hormone level was 200.5 pg/ml, and vitamin D was 62.7 ng/ml. The patient had osteopenia of the left femur, no nephrolithiasis, and no neuropsychiatric symptoms. On nuclear medicine single photon-emission CT, the right superior parathyroid gland was 9 mm with focal persistent abnormal fluorodeoxyglucose uptake, suggesting adenoma (Figure 1). During surgery, unexpected desmoplastic changes with dense adherence were observed, thus en-bloc resection of the right superior parathyroid gland and right thyroidectomy with central

neck dissection were performed. Pathology showed invasive parathyroid carcinoma with Hashimoto thyroiditis without lymph node invasion and was staged as T1N0M0. Intraoperative parathyroid hormone decreased from 150 to 36 pg/ml, whilst the calcium level dropped to normal range and remained stable. During postoperative follow-up, the patient's level of thyroid-stimulating hormone increased to 6.1 mIU/ml and required levothyroxine supplement to normalize the level. After extensive counseling on genetic testing, the patients agreed to testing of adaptor-related protein complex 2 subunit sigma 1 (*AP2S1*), calcium sensing receptor (*CASR*), cell division cycle 73 (*CDC73*), cyclin-dependent kinase inhibitor 1B (*CDKN1B*), guanine nucleotide-binding protein subunit alpha-11 (*GNAI1*), multiple endocrine neoplasia I (*MEN1*), and rearranged during transfection (*RET*), which were all negative for mutation. **Discussion:** Surgical removal of the parathyroid gland is indicated for symptomatic and asymptomatic hyperparathyroidism in younger, osteoporotic patients or those with kidney dysfunction (3). Nuclear medicine single photon-emission CT can be suggestive for carcinoma but biopsy is confirmatory. Examination of the gland and surrounding structure intraoperatively is the key to deciding the type and extent of surgery (7). Recurrent disease is observed in two-thirds of patients and needs follow-up (7). Combination of parathyroid carcinoma and thyroid disease is unusual but the possibility should not be ignored (8). Similarly testing for additional genetic mutation with *AP2S1*, *CASR*, *CDC73*, *CDKN1B*, *GNAI1*, *MEN1*, and *RET* might be necessary to identify familial *versus* sporadic cases. **Conclusion:** Parathyroid carcinoma is a rare but important cause of primary hyperparathyroidism. Accurate diagnosis can be made from postoperative pathology necessitating a high index of suspicion.

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Figure 1. Nuclear medicine single photon-emission computed tomography showing focal persistent fluorodeoxyglucose uptake at the right superior parathyroid gland.

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5 CHRONIC MYELOID LEUKEMIA: AN UNCOMMON ETIOLOGY OF ISCHEMIC STROKE

Rabia Kiani¹, Amna Nadeem Kiani²,
Mahum Shahid¹ and Guy Vin Chang¹

¹University of South Dakota Sanford
School of Medicine, Sioux Falls, SD, U.S.A.;

²Rawalpindi Medical College, Rawalpindi, Pakistan

Background: Ischemic stroke is most commonly caused by thrombosis or embolism. Blood malignancies are an uncommon primary etiology of stroke. **Case Report:** An unusual case of chronic myeloid leukemia (CML) in chronic stable phase that presented as stroke due to leukostasis syndrome. **Results:** An 83-year-old female, with hypertension, presented with complaints of acute left-sided weakness and confusion. Her neurological examination was significant for left-sided hemiparesis and absence of planter reflex. Computed tomographic scan of the head was negative and computed tomographic angiogram of the head and neck showed no evidence of stenosis. Bloodwork revealed white blood cells at $>445.0 \times 10^3/\mu\text{l}$, hemoglobin of 10.9 g/dl and platelets at $210 \times 10^3/\mu\text{l}$. The patient's symptoms were interpreted as leukostasis syndrome and she was started on leukapheresis and hydroxyurea to lower her white blood cell count. Her clinical status continued to deteriorate as she developed severe hypotension, metabolic acidosis, acute kidney injury and acute hypoxic respiratory failure requiring intubation. The family decided to pursue comfort care and the patient, unfortunately, passed away. Peripheral blood

smear showed marked leukocytosis with absolute neutrophilia with left shift, absolute eosinophilia and absolute basophilia. Bone marrow biopsy revealed findings consistent with CML in hypercellular bone marrow (100%) with marked granulocytic hyperplasia, increased megakaryocytes, erythroid hypoplasia and blasts cells less than 5%. Fluorescence *in situ* hybridization analysis indicated breakpoint cluster region-Abelson murine leukemia 1 (*BCR-ABL1*) gene fusion in 97.6% of nuclei. Autopsy revealed multiorgan involvement with CML (heart: right/left ventricle, interventricular septum; both lungs along with mediastinal lymph nodes; small and large intestine, esophagus, stomach, liver and gall bladder; kidneys, bladder and uterus), confirmed microscopically. *Conclusion:* CML is a myeloproliferative disorder characterized by *BCR-ABL1* gene fusion. Leukostasis syndrome is a complication of hyperleukocytosis (white blood cell count $>100.0 \times 10^3/\mu\text{l}$). It is most commonly seen in lungs and the central nervous system. It is associated with acute myeloid leukemia and CML with blast crisis, whereas our patient's CML was in chronic stable phase.

6

DISPARITIES NEED ATTENTION IN BREAST CANCER PREVENTION: ASSESSMENT OF SYSTEM-WIDE DISPARITIES IN MAMMOGRAPHY SCREENING AMONG BLACK AND WHITE WOMEN

Theresa Timmes King¹, Adelaide McClintock¹, Julie Gralow^{1,2,3}, Leah Marcotte¹, Janie Lee^{1,2}, Kemi Doll^{1,2,3} and Rachel Yung^{1,2,3}

¹University of Washington, Seattle, WA, U.S.A.;

²Seattle Cancer Care Alliance, Seattle, WA, U.S.A.;

³Fred Hutchinson Cancer Research Center, Seattle, WA, U.S.A.

Background: Black and White women are equally likely to develop breast cancer but Black women are significantly more likely to die from it (1). Disparities exist across the breast cancer care continuum, starting with lower rates of mammography screening (2), resulting in more advanced stage at diagnosis and higher mortality (1, 3). The University of Washington (UW) is a prime center for studying this disparity, as a regional academic health center serving a diverse population through regional primary care clinics, and partner of a comprehensive cancer institute, Fred Hutchinson/Seattle Cancer Care Alliance. *Materials and Methods:* To improve population-level care, UW developed a database of patient information from electronic medical records, regarding the receipt of important medical care measures, including mammography. It can present data by clinic and patient demographics *via* interactive dashboards.

Metrics assessing mammography screening evaluate eligible women aged 52-70 years, and capture mammography performed in the previous 24 months at both UW and outside medical facilities, providing a comprehensive evaluation of population-level screening rates. *Results:* Over 30,000 women in UW primary care are eligible for breast cancer screening. Among these women, screening rates in White and Black women were found to be 74% and 61% respectively, according to data captured over 24 months of 2018-2019. Disparities continue to exist in those with commercial insurance (78% vs. 69% respectively). Over 80% of clinics were found to be below the national threshold for mammography screening for their Black population, compared to <60% for the White population. Notably, the highest Black/White disparity indices (1.60-1.65) were at clinic systems serving a smaller proportion of Black women. *Conclusion:* These data present an opportunity and obligation to address racial disparities in breast cancer screening as part of the need to improve mortality of Black women from breast cancer. This clinic- and population subgroup-specific data can facilitate understanding barriers to care within this large healthcare system.

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7

AN UNUSUAL CAUSE OF APLASTIC ANEMIA

Shobha Mandal, Najma Nawaz, Joyson Poulouse and Vineela Kasireddy

Guthrie Robert Packer Hospital, Sayre, PA, U.S.A.

Background: Drug-induced Aplastic anemia is uncommonly associated with chemotherapeutic agents. It is caused by two distinct mechanisms - dose-related reversible marrow aplasia, and dose-independent idiosyncratic aplasia. Treatment depends on age, disease severity, donor availability, and performance status of the patient. *Case Report:* A 67-year-old female diagnosed with stage IIIA endometrial cancer was treated with hysterectomy with bilateral salphingo-oophorectomy followed by six cycles of

carboplatin and paclitaxel chemotherapy. Her pre-chemotherapy laboratory works ups were normal but she later developed severe pancytopenia treated with supportive measures and steroids. Peripheral blood smear showed was negative for blasts. Bone marrow biopsy showed markedly hypocellular (5-10% cellularity) marrow. She was evaluated by a stem cell transplant center and was planned to be treated with cyclosporine and anti-thymocyte globulin. *Conclusion:* Prolonged and severe myelosuppression during or after chemotherapy should raise concern for bone marrow failure syndromes. Prompt diagnosis and treatment can significantly affect the outcome of patients.

8

ADDRESSING DISPARITIES IN COLORECTAL CANCER SCREENING AMONG SOUTH ASIANS IN THE SAN FRANCISCO BAY AREA

Arnab Mukherjee^{1,2,3}, Priya Raman¹, Faryal Irfan², Shabana Ali¹, Pooja Lal¹, Varsha Sharma¹, Zubaida Qamar^{3,4}, Susan L. Ivey^{3,5} and Sora Park Tanjasiri^{6,7}

¹Department of Health Sciences, California State University, East Bay, Hayward, CA, U.S.A.;

²Pre-Professional Health Academic Program, California State University, East Bay, Hayward, CA, U.S.A.;

³Asian American Research Center on Health, San Francisco, CA, U.S.A.;

⁴Department of Family Interiors, Nutrition & Apparel, San Francisco State University, San Francisco, CA, U.S.A.;

⁵Division of Community Health Sciences/Health Research for Action, School of Public Health, University of California Berkeley, Berkeley, CA, U.S.A.;

⁶Chao Comprehensive Cancer Center, University of California, Irvine, CA, U.S.A.;

⁷School of Medicine, University of California, Irvine, CA, U.S.A.

Background: Cancer screening, particularly for colorectal cancer (CRC), reduces incidence and mortality. Population-level studies often combine Asian American data into a singular category, masking disparities in risk and outcomes. South Asians - individuals with origins from Bangladesh, India, Pakistan and other subcontinental regions - exhibit low CRC screening rates in the U.S.A., consistently not meeting recommendations by major health institutions. South Asian communities in the U.S.A., particularly those not of Asian Indian origin, exhibit myriad sociocultural, historical, and behavioral distinctions influencing CRC disparities. This study enhanced prior investigations of CRC screening through inclusion of two large yet understudied segments of the South Asian population: Pakistanis and Indo-Fijians. Key objectives were to explore knowledge about CRC cancer

prevention and detection, acceptability of different screening modalities, barriers and facilitators to CRC screening, access to and use of health services involving CRC screening, and information-seeking behavior among these vulnerable groups. *Materials and Methods:* Eight focus groups (stratified by gender/subgroup) generated qualitative data elucidating key influences on CRC screening (n=54). Deductive content analyses generated themes encompassing similarities and differences in determinants of screening among Pakistanis and Indo-Fijians, with comparative examination with prior work conducted among Asian Indians and Bangladeshis. *Results:* Factors unique to Pakistanis and Indo-Fijians include trepidation about specific screening modalities, fatalistic worldviews regarding potential cancer diagnoses, and lack of culturally-appropriate outreach and proactive communication from healthcare providers. Mistrust of public healthcare systems stemming from Islamophobia and reluctance to dispel “model minority” ascriptions were considered key impediments to CRC screening. Formal content analyses will generate themes encompassing perceptions of and experiences with CRC screening, and roles of providers in providing timely, accurate, and culturally-sensitive information. *Conclusion:* Study findings elucidate multi-level targets for interventions valuable for increasing screening rates and, ultimately, reducing disproportionate burdens of preventable CRC among South Asians in ethnic enclaves throughout the U.S.A.

9

ISOLATED LIVER MASS PRESENTING AS METASTATIC MELANOMA OF UNKNOWN PRIMARY

Fiyyinfolu Odemuyiwa, Dhatri Malipeddi and Adarsh Vennepureddy

Canton Medical Education Foundation/NEOMED, Canton, OH, U.S.A.

Background: Melanoma of unknown primary (MUP) is an uncommon phenomenon with limitations in clinical and biological understanding of its occurrence. Most melanoma discovered in visceral organs represent metastasis from a known primary site (1). Ocular melanoma is notorious for distant metastasis to the liver (2). A solitary liver mass presenting as primary melanoma is rare phenomenon; when this occurs, it is referred to as a MUP (3). We present a case of an isolated liver mass presenting as metastatic melanoma with no evidence of primary cutaneous or ocular melanoma. *Case Report:* A 64-year-old male with no past medical history presents with complains of abdominal pain, early satiety, 10-lb weight loss and night sweats. Blood work revealed elevated aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase levels. Physical examination revealed

distended abdomen with a firm large liver extending to the pelvis. Computed tomography of the abdomen and pelvis revealed a 15.9×15.8×1.9 cm macrolubulated hepatic mass. Biopsy of liver mass revealed tumor cells positive for S100 calcium binding protein and melan-A consistent with metastatic melanoma. Positron-emission tomography scan verified a large 21-cm hypermetabolic hepatic tumor with intense metabolic activity. Immunohistochemistry showed 0% expression of programmed cell death receptor 1 (PD1) and negativity for B-Raf proto-oncogene (*BRAF*-V600) mutations. The patient was started on single-agent monoclonal antibody to PD1 (pembrolizumab). Three-month follow-up visit revealed significantly elevated liver transaminase and total bilirubin levels. The patient required a biliary stent placement. The decision was made to add cytotoxic T-lymphocyte-associated protein 4 inhibitor with ipilimumab. The patient was switched to a different anti-PD1 therapy with nivolumab. Six-month follow-up visit from transition to ipilimumab and nivolumab therapy revealed transaminase and total bilirubin levels trending downwards, indicating stability in clinical course and response to treatment. *Discussion:* The predominant hypothesis regarding MUP involves immune-mediated spontaneous regression of melanoma from a known primary site after metastasis has occurred (2). Visceral MUP is usually staged as stage IV MUP and managed like stage IV melanoma of known primary (4). Studies have evaluated the overall survival of stage IV MUP compared to matched stage IV melanoma of known primary and noticed favorable outcomes in those with stage IV MUP (4). In the era of immunotherapy and targeted therapy, there are limited studies on the overall survival of stage IV MUP treated with these therapies (5). We treated our patient based on studies of stage IV melanoma of known primary with matched stage IV MUP using single-agent anti-PD1. *Conclusion:* The purpose of this case report is to show that immunotherapy use should not be limited to metastatic melanoma of known primary but can be beneficial in the management MUP. Therefore, the absence of a primary site should not prevent clinicians from attempting to manage patients with MUP similarly to stage-matched patient with equivalent melanoma of known primary.

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TREATMENT-RESISTANT RECURRENT THROMBOEMBOLISM LEADING TO LIFE-THREATENING BOWEL ISCHEMIA: HOW INNOCENT IS 'REACTIVE' THROMBOCYTOSIS?

Mahum Shahid, Rabia Kiani and Danial Siddiqui

University of South Dakota Sanford School of Medicine, Sioux Falls, SD, U.S.A.

Background: Mild thrombocytosis during hospitalization is commonly observed and often deemed 'secondary' or 'reactive' to acute illness/infection. *Case Report:* A 61-year-old female presented to the Emergency Department with a 2-week history of abdominal pain. The patient's past medical history was significant for recurrent unprovoked pulmonary embolism with the first episode 11 years earlier. Thrombophilia workup was negative, and she was put on warfarin. Ten months prior to this admission, the patient was incidentally found to have a portal vein thrombosis along with splenic vein thrombosis on an abdominal computed tomography. Notably, the patient was compliant on warfarin as per the International Normalized Ratio so she was switched to enoxaparin at a therapeutic dose. On this admission, computed tomography showed progression of thrombus in the splenic vein and main portal vein, along with multiple dilated small bowel loops concerning for bowel ischemia. Exploratory laparotomy resulted in a 30-cm small bowel resection. On chart review, the patient was found to have few and far spaced readings of elevated platelet count ranging between 264-958×10³/μl in the previous 11 years which were considered "reactive". Breakpoint cluster region-Abelson murine leukemia 1 (*BCR-ABL1*) reverse transcription- polymerase chain reaction and Janus kinase 2 (*JAK2*, V617F) point mutation panel were ordered and *JAK2* (V617F) mutation was confirmed. A diagnosis of essential thrombocythemia was

made. *Conclusion:* Myeloproliferative neoplasms with *JAK2* (V617F) mutation are thought to be independent risk factors for splanchnic venous thrombosis which can even be a presenting feature of latent essential thrombocythemia. Direct oral anticoagulants can be considered in patients who have progression of thrombosis on warfarin or heparin but a formal trial is needed. Thrombocytosis, however mild, in patients with recurrent treatment-resistant thromboembolism should be investigated for myeloproliferative neoplasms.

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PAGET-SCHROETTER SYNDROME – A RARE ETIOLOGY OF UPPER EXTREMITY DVT IN YOUNG PATIENTS

Litty Thomas, Vineela Kasireddy
and Chandrakala Dadeboiyina

Guthrie/Robert Packer Hospital-Internal Medicine
Residency, Sayre, PA, U.S.A.

Background: Paget-Schroetter Syndrome (PSS) or effort thrombosis is an uncommon etiology of recurrent upper extremity deep venous thrombosis (UEDVT) occurring in younger, physically active adults consists of thrombosis of subclavian and/or axillary veins and its incidence is reported as 2 per 100,000 persons per year. The etiology of PSS is venous obstruction by thoracic outlet syndrome in conjunction with vigorous activity causing microtrauma to the intima of veins leading to thrombus formation. *Case Report:* A 23-year-old healthy female presented with acute onset of left upper extremity pain and swelling. Duplex showed DVT of the left subclavian, axillary and basilic vein. She underwent immediate pharmacomechanical thrombectomy by intervention radiology due to significant symptoms. Initially, UEDVT was thought to be secondary to her oral contraceptive pill use for 6 years. Further evaluation by vascular surgery postulated PSS given the persistent clot burden at the thoracic outlet and the presence of extensive collaterals around the neck in venogram. She underwent multiple mechanical, catheter-directed chemical thrombectomies and angioplasties due to her extensive clot burden. The patient was discharged with recommendations to continue oral anticoagulation, frequent follow-ups, to use contraception other than oral contraceptive pill. The need for thoracic widening surgeries in the case of recurrent DVTs in the future was also explained to the patient. *Conclusion:* PSS is a rare cause of UEDVT; a high index of suspicion is needed for its diagnosis in any UEDVT case. With PSS, the usual DVT anticoagulation treatments may not be sufficient to prevent life-threatening complications such as stroke or pulmonary embolism. In addition, thrombectomy or thoracic outlet-widening surgeries may be needed.

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OUTCOMES OF CAR T-CELL THERAPY FOR DIFFUSE LARGE B-CELL LYMPHOMA AT A TERTIARY CENTER SERVING A LARGE UNDERSERVED POPULATION

Ayman Qasrawi and Gerhard C. Hildebrandt

Division of Hematology and Blood & Marrow
Transplantation, Markey Cancer Center, University
of Kentucky, Lexington, KY, U.S.A

Background: Kentucky has been listed as one of five states with the highest mortality rates for leukemia and lymphoma by the National Cancer Institute's Surveillance Epidemiology and End Results program. Twenty-nine of the 100 poorest counties in the U.S.A. are in Kentucky. The University of Kentucky is the only healthcare system in the state offering chimeric antigen receptor (CAR) T-cell therapy for diffuse large B-cell lymphoma. Costs and complexity of this treatment are high, and patients require meticulous care to optimize outcomes. *Materials and Methods:* We studied the effects of socioeconomic disparities in patients treated with CAR T-cell therapy at our institution. The US Census Bureau and 2013-2017 American Community Estimates were used to determine per capita income, poverty percentage and lack of health insurance percentage among the residents of the cities the patients lived in. *Results:* Ten patients with diffuse large B-cell lymphoma were treated between August 2018 and October 2019 with commercially available axicabtagene ciloleucel CAR T-cell therapy. Their median age was 64 years; six were males. The median distance of their residence to the hospital was 65 miles. Mean per capita income, poverty percentage and lack of health insurance percentage were \$24,200, 18% and 9.6%, respectively. This compares to \$31,177, 15% and 10.5% in the whole US population. Six patients had stage IV disease; four had an International Prognostic Index score of 4 at time of relapse. Complete response rates were 60%. Eight developed cytokine release syndrome (grade I: 6; II: 1; IV: 1). Six had neurotoxicity (grade I: 1; III: 4; IV: 1). After a median follow-up time of 13 months, progression-free survival and overall survival were 50% and 60%, respectively. Two patients died of progressive disease and two from infection. *Conclusion:* CAR T-cell therapy can be safely and efficaciously offered at an academic center to a patient population characterized by low socioeconomic status and limitations in access to care.

Conflicts of Interest

GCH reports equity ownership from Axim Biotechnologies, Novartis, Insys Therapeutics, Abbvie, GW Pharmaceuticals, Cardinal Health, Clovis Oncology, Cellectis, CVS Health, Celgene, Bluebird Bio, Bristol-Myers Squibb/Medarex, Crispr Therapeutics, IDEXX Laboratories, Johnson & Johnson, Pfizer,

Procter & Gamble, Vertex, Bayer, Scotts-Miracle, Charlottes Webb CWBHF, Alimmune Therapeutics Inc AIMT, Medical PPTYS TR Inc. MPW, Caretrust Reit Inc CTRE, ANGI Homeservices Inc ANGI, MPW (medical PPTYS), Caretrust (CTRE), and Aimmune. GCH reports consulting/advisory role from Incyte; research funding from Takeda, Jazz Pharmaceuticals, Pharmacyclics, Incyte and Astellas Pharma; and received travel/accommodations expenses from Falk Foundation, Incyte and Takeda.

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HYPERCALCEMIA ASSOCIATED WITH ISOLATED BONE MARROW SARCOIDOSIS WITHOUT ANY PULMONARY/ EXTRAPULMONARY INVOLVEMENT

Dhatri Malipeddi, Fiyinfolu Odemuyiwa, Pritika Manaktala and Ferdinando Cortese

Canton Medical Education Foundation/NEOMED, Canton OH, U.S.A.

Background: Extrapulmonary presentation of sarcoidosis occurs in approximately 10% of cases, mostly in lymph nodes, eyes (uveitis), skin and nervous system. Bone marrow involvement as the sole site at presentation is rare and reported conclusively in only two cases to our knowledge. We present a case of isolated bone marrow sarcoidosis at presentation, with absence of other organ involvement documented by modern imaging studies, and with severe hypercalcemia as the presenting symptom. *Case Report:* A 71-year-old Caucasian male presented with debilitation, confusion and dizziness. At presentation, serum calcium was 13.8 mg/dl (baseline 1 month earlier), hemoglobin 9.6 g/l, platelet count 148,000/mm³, parathyroid hormone level 6.4 pk/ml (low), hydroxyvitamin D

65 ng/ml, and 1,25 dihydroxy vitamin D 101 pg/ml. Levels of bone-specific alkaline phosphatase, parathyroid hormone-related protein level, prostate-specific antigen and angiotensin-converting enzyme were normal. No lymphadenopathy was found on physical examination. Computed tomography of the thorax revealed mild reactive mediastinal lymphadenopathy, and that of the abdomen/pelvis was insignificant. Because of elevated 1,25 hydroxyvitamin D level and negative imaging studies, a bone marrow biopsy was performed, lymphoma being considered as the most likely diagnosis. The bone marrow biopsy showed hypercellular bone marrow (60% cellularity) with numerous epithelioid histiocytes, a few multinucleated giant cells, and many not necrotizing granulomas. Fungal and mycobacterial stains were negative. A diagnosis of sarcoidosis was made, the patient was treated with prednisone, at an initial dose of 60 mg, rapidly tapered down, with resolution of the hypercalcemia. *Discussion:* Because of negative computed tomographic scans, we documented the isolated involvement of the bone marrow rather conclusively. Severe hypercalcemia was the presenting symptom in our patient and in another reported. Multiple myeloma was suspected in the other reported case because of monoclonal gammopathy, and lymphoma in our case because of the patient's age, therefore sarcoidosis was an unexpected finding. Our case also illustrates how a systematic approach to the differential diagnosis of hypercalcemia can lead to the correct diagnosis and treatment.

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