Underwriting

Meeting with the Medical Directors

Complex Case Studies
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John Hancock Financial Services

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Complex Case Studies
Tremor and Anemia

Sheila MacDonnell, MD, MS, DBIM
AVP, LTC Medical Director
John Hancock Financial Services
Case 1 - History

• 58 year old male with a history of mild obstructive sleep apnea, migraines, and a tremor
• Applicant is compliant with CPAP for his sleep apnea, migraines occur occasionally and are treated with 800mg ibuprofen
• Tremor has been present for at least 4 years
• Last office visit was in Dec 2012 for a complete physical exam. During visit MD asked about tremor and applicant stated that the tremor had gotten slightly worse over the years
• During discussion applicant asked if there was medication for the tremor
• The tremor involves both hands with his right slightly worse than the left
• Applicant has noticed he is a little more careful pouring hot coffee
• No other complaints
Case 1 - History

- Family history – Grandfather had Parkinson’s disease, mother had a head tremor

- Social history – CEO of a small company, work is going well, nonsmoker, alcohol – he notes improvement in the tremor with alcohol but drinks only occasionally, exercises- walking 5 days/week

- PE – Body mass index (BMI) 30, BP 140/70, NAD, normal gait, lungs clear, cardiac exam was normal, Abdomen benign, extremities without edema. Bilateral tremor R>L noted when hands are held out straight

- MD writes “Tremor slightly worse – switch lisinopril to beta blocker, monitor outpatient Bp, return to clinic in 6 months”
Case 1 – Decision Point

• Do you have enough information to offer?

• If yes, would your offer be favorable or unfavorable and why?

• If no, what other information would you like?

• How many of us think we should require a neurological evaluation prior to any offer?
Case 1 – Underwriting Tremor

• Age of onset
• Medications
  – Including lithium, prednisone, levothyroxine, SSRIs
• Diarrhea or weight loss
• Character of the tremor
  – Symmetric or unilateral
  – What part(s) of body involved?
  – Stable or progressive
  – Present at rest or with action
  – Does it change with alcohol?
• Other neurologic symptoms or signs
• Family history of tremor
• Family history of Parkinson’s disease
Case 1 - Tremors

- Essential tremor
- Tremor of Parkinson disease
- Other neurological disorders causing tremor

Common tremors

<table>
<thead>
<tr>
<th>Resting tremor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parkinson disease</td>
</tr>
<tr>
<td>Parkinsonian syndromes</td>
</tr>
<tr>
<td>Midbrain (rubral) tremor</td>
</tr>
<tr>
<td>Wilson's disease</td>
</tr>
<tr>
<td>Severe essential tremor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postural-action tremor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced physiologic tremor</td>
</tr>
<tr>
<td>Essential tremor</td>
</tr>
<tr>
<td>Primary writing tremor</td>
</tr>
<tr>
<td>Other extrapyramidal disorders</td>
</tr>
<tr>
<td>Parkinson disease</td>
</tr>
<tr>
<td>Wilson's disease</td>
</tr>
<tr>
<td>Dystonia</td>
</tr>
<tr>
<td>Cerebellar disease</td>
</tr>
<tr>
<td>Peripheral neuropathy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intention tremor (cerebellar outflow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebellar disease</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
</tr>
<tr>
<td>Midbrain stroke</td>
</tr>
<tr>
<td>Midbrain trauma</td>
</tr>
</tbody>
</table>
Case 1 - Essential Tremor (ET)

- Referred to as “familial” when there is a family history present and “essential” tremor when it is sporadic
- Essential tremor may not always be “benign” if severe
- Worldwide prevalence is approximately 5%
- Incidence is equal in males vs females
- Clinical variability
- Postural or action tremor
- Incidence increases with age by often affects younger individuals
- Genetics, environmental impact and neuropathology still being studied
  - Tentative links to genetic loci on chromosomes 2p, 3q13, and 6p23
  - Lack of 100% concordance with monozygotic twins
  - Neuropathology in the brainstem and cerebellum

Source: http://www.uptodate.com/contents/overview-of-tremor
# Case 1 – Essential Tremor Criteria

## Criteria for diagnosis of essential tremor

<table>
<thead>
<tr>
<th>Core criteria</th>
<th>Secondary criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral action tremor of the hands and forearms (but not rest tremor)</td>
<td>Long duration (&gt;3 years)</td>
</tr>
<tr>
<td>Absence of other neurologic signs, with the exception of cogwheel phenomenon</td>
<td>Positive family history</td>
</tr>
<tr>
<td>May have isolated head tremor with no signs of dystonia</td>
<td>Beneficial response to alcohol</td>
</tr>
</tbody>
</table>

Examples of Clinical Findings in Patients with Essential Tremor

The first and second segments show postural tremor in an outstretched arm in two different patients. The third segment shows a patient with kinetic tremor pouring water between two cups. The fourth shows a patient with kinetic tremor drawing an Archimedes spiral.
Case 1 - Parkinson Disease (PD)

- Progressive neurodegenerative disease associated with increased morbidity and mortality
- 1% of population >60 years old
- Incidence greater in males than females
- Disruption in dopamine neurotransmission
- >10 genes or gene loci have been implicated, but mutation in a single gene is uncommon
- 20-25% of people with PD will have an affected relative (first or second)
- Clinical features: tremor, slowness and paucity of movement, rigidity, gait disorder, cognitive dysfunction and dementia, psychiatric sx's
- Tremor can initially be intermittent, typically starts as unilateral, present at rest, “pill-rolling” in nature

Case 1 - Tremor of Parkinson Disease Video

The NEW ENGLAND JOURNAL of MEDICINE

A Woman with Tremor and Decreased Dexterity

This video clip of a 57-year-old, right-handed woman with a one-year history of tremor and decreased dexterity in the right hand illustrates classic features of early, asymmetric Parkinson's disease. The video clip shows the typical rest tremor in the right hand. The tremor disappears with movement but returns with sustained posture, a feature seen in some patients with Parkinson's disease. As is characteristic of rest tremor, the tremor is absent when she alternately touches her nose and extends her arms. Finger tapping with the right hand shows bradykinesia, manifested as decreased speed, amplitude, and cadence, as compared with the unaffected left hand. Walking is abnormal only in that the patient does not swing the right arm and the rest tremor appears in the right hand.
## Case 1 - PD vs ET

<table>
<thead>
<tr>
<th>Features</th>
<th>Parkinson Disease Tremor</th>
<th>Essential Tremor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age at onset</strong></td>
<td>Typically &gt; 50 years old</td>
<td>Second and sixth decades</td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Character</strong></td>
<td>At rest</td>
<td>Postural, kinetic</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Hands, legs, tongue, chin</td>
<td>Head, voice, hands</td>
</tr>
<tr>
<td><strong>Other features</strong></td>
<td>Gait disturbance, bradykinesia, rigidity</td>
<td>Normal gait</td>
</tr>
<tr>
<td></td>
<td>Neuropsychological symptoms</td>
<td></td>
</tr>
</tbody>
</table>

Case 1 - Tremor and LTC Claims

FIGURE 7: Distribution of Number of Total Claims by Diagnosis

Total Claims - Claim Counts by Diagnosis

- Alzheimer's, 20.7%
- Stroke, 10.7%
- Nervous System and Sense Organs, 6.6%
- Circulatory, 9.8%
- Injury, 9.8%
- Cancer, 9.9%
- Arthritis, 10.7%
- Mental, 5.6%
- Respiratory, 5.3%
- Digestive System, 1.8%

Case 1 - Summary

Significant case information

• Tremor is bilateral, involving the hands, relatively stable over several years
• No indication of any additional neurological signs or symptoms
• Alcohol improves the tremor
• Family history of both Parkinson disease (PD) and familial tremor (ET)
• MD plans to treat with beta blockers

• Underwriting assessment
  – Above aspects of the tremor and lack of other neurological signs or symptoms support a familial tremor
Case 2 - History

- 60 year old male applying for LTC
- Past medical history - Hypertension, high cholesterol, duodenal ulcer age 48, right total knee replacement in 2008, non-Hodgkin lymphoma treated in his 20s
- Medications - lisinopril, simvastatin, acetaminophen prn
- Family history - Father had a heart attack at age 60
- Social history - Contractor, prior smoker quit age 35, social alcohol use
- Recent office visit (Dec 2012) - Productive cough x 5 days. 5'10", 175lbs. T 101.5 BP 140/85. No acute distress, lungs with scattered wheezes, cardiac exam was normal
- MD assessment and plan – Acute bronchitis. Rest, fluids, azithromycin, and a complete blood count (CBC) was drawn
### Case 2 - History

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
<th>Reference Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC (per mm³)</td>
<td>3,800</td>
<td>4,500 - 11,000</td>
</tr>
<tr>
<td>Hb (g/dl)</td>
<td>11.7</td>
<td>13.5 – 17.5</td>
</tr>
<tr>
<td>HCT (%)</td>
<td>34.6</td>
<td>41.0 – 53.0</td>
</tr>
<tr>
<td>MCV (fl)</td>
<td>103</td>
<td>80 - 100</td>
</tr>
<tr>
<td>Platelets (per mm³)</td>
<td>151,000</td>
<td>150,000- 350,000</td>
</tr>
</tbody>
</table>
Case 2 - History

- The applicant returned to the office one month later to have a repeat CBC, iron studies, B12 and folate levels
- WBC 3,900, Hb 11.7, HCT 34.6, platelets 153,000, MCV 103
- Iron studies: iron 84 (45-160mcg/dl), iron binding capacity 332 (228-428mcg/dl), ferritin 79 (30-300ng/ml)
- B12 level 578 (normal >300 pg/ml), folate level 8 (normal >4ng/ml)
- At this visit a rectal exam was also performed and a fecal occult blood test (FOBT) was negative

- MD assessment and plan - Mild asymptomatic anemia. Stable. Repeat in 4-6 months. If worsens consider further evaluation
Case 2 – Decision Point

- Do you have enough information to determine an offer?
- If yes – favorable or unfavorable?
  - If favorable why?
  - If unfavorable why?
- If not enough information – what would you like to know?
### Case 2 - History

Historical lab results in medical records:

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>Dec 2012</th>
<th>Recent repeat</th>
<th>Reference Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC (per mm³)</td>
<td>6,000</td>
<td>4,200</td>
<td>3,800</td>
<td>3,900</td>
<td>4,500-11,000</td>
</tr>
<tr>
<td>Hb (g/dl)</td>
<td>13.7</td>
<td>12.1</td>
<td>11.7</td>
<td>11.7</td>
<td>13.5 – 17.5</td>
</tr>
<tr>
<td>HCT (%)</td>
<td>40.7</td>
<td>35.3</td>
<td>34.6</td>
<td>34.6</td>
<td>41.0 – 53.0</td>
</tr>
<tr>
<td>MCV(fl)</td>
<td>98</td>
<td>101</td>
<td>103</td>
<td>103</td>
<td>80 - 100</td>
</tr>
<tr>
<td>Platelets (per mm³)</td>
<td>155,000</td>
<td>158,000</td>
<td>151,000</td>
<td>153,000</td>
<td>150,000-350,000</td>
</tr>
</tbody>
</table>

Does this information change your opinion?
Case 2 - Complete Blood Count (CBC)

Complete Blood Count (CBC) components:

- White blood cell (WBC) count
- Red blood cell (RBC) count
  - (Hb/HCT)
- Platelet (Plt) count
Case 2 - Anemia - RBCs, Hb, and HCT

- Reduction in one or more of the major RBC measurements: Hb, HCT, or RBC count

- Anemia is defined as values which are more than 2 SD below the mean

- Hemoglobin (Hb): measures the concentration of oxygen carrying pigment

- Hematocrit (HCT): percent of a sample of whole blood occupied by intact RBCs

- RBC count: number of RBCs contained in a specified volume of whole blood

This photo shows two anticoagulated blood-filled Wintrobe hematocrit tubes following high speed centrifugation. The tube on the left is from a normal subject, with a hematocrit of 38 percent (blue arrow). The tube on the right is from a 19-year-old female with essential thrombocytosis and a platelet count of 5,000,000/microL. The extreme degree of thrombocytosis can be appreciated by the presence of a marked increase in the size of the “buffy coat” (white arrow). When the Wintrobe tube is filled to near capacity (upper arrows), the platelet count can be estimated by the thickness of this layer, with each mm being equivalent to one million platelets/microL. In normal subjects, the “buffy coat”, which is comprised of white blood cells and platelets, is only minimally visible.

Courtesy of Stephen A Landaw, MD, PhD.
Case 2 – Causes of Anemia

• Decreased RBC production
  – Nutrient deficiency (ex: iron, B12 or folate deficiency)
  – Bone marrow disorders (ex: aplastic anemia, myelodysplasia, tumor infiltration)
  – Bone marrow suppression (ex: drugs, chemotherapy, irradiation)
  – Low levels of hormones that normally stimulate RBC production (ex: low erythropoietin levels that can be seen in chronic renal failure)
  – Anemia of chronic disease/inflammation (ex: infectious, inflammatory or malignant disorders)

• Increased RBC destruction
  – Hemolytic anemias (ex: sickle cell disease)

• Blood loss
  – Occult bleeding (ex: gastric or colon cancer, ulcer), trauma, surgery, menstrual, overt gastrointestinal bleeding, phlebotomy or blood donation
Case 2 – Characterization of Anemia

• Mean corpuscular volume (MCV) = automatic cell counters estimate RBC volume cell by cell sampling millions of RBCs in the process
  – Normal RBC volume = 80-96 femtoliters (fl)

• Macrocytic anemia = large RBCs (MCV>100fl)
  – Reticulocytosis
  – Abnormal nucleic acid metabolism (folate or B12 deficiency, drugs that interfere with nucleic acid synthesis)
  – Abnormal RBC maturation (myelodysplastic syndrome, acute leukemia)
  – Alcohol abuse, liver disease, hypothyroidism

• Microcytic anemia = small RBCs (MCV <80fl)
  – Reduced iron availability (iron def, AoCD)
  – Reduced heme synthesis (lead poisoning)
  – Reduced globulin production (thalassemia and other hemoglobinopathies)

• Normocytic anemia = normal size RBCs (MCV 80-100fl)
  – Large category and can be present in early phases of many of the above conditions (acute blood loss, early iron def, AoCD, bone marrow disorders)
Case 2 - Leading Causes of Anemia in the Older Adult

- Decreased RBC production
  - Nutrient deficiency (iron, B12, folate)
  - Bone marrow disorders
  - Chronic kidney disease
  - Anemia due to chronic disease/inflammation

- Blood loss
  - Occult bleeding
Case 2 - Anemia and LTC Claims

FIGURE 7: Distribution of Number of Total Claims by Diagnosis

Case 2 - Summary

Significant case information

• Historical values were once normal
• Two cell lines affected (WBC, Hb/HCT)
• Macrocytosis with normal B12 and folate, no indication of excess alcohol intake
• Prior non-Hodgkin lymphoma – likely treated with chemotherapy
• Contractor – occupational exposures?

• Underwriting concern: Recognize possible bone marrow condition evolving such as myelodysplastic syndrome (MDS):
  – Group of hematopoietic stem cell disorders associated with dysplastic blood cell production
  – Can cause anemia and other cytopenias leading to increased risk of symptomatic anemia, bleeding and infection, and transformation to acute leukemia
Case 2 - Anemia and Morbidity

- An underwriter should always think “Anemia due to what?” and look for the underlying cause.
- Anemia is not considered a normal part of aging.
- Be cautious of anemia in the older adult treated with chronic iron therapy.
- A bone marrow process should be considered when there is more than one cell line that is abnormal (WBC, Hb/HCT, plts).
- Anemia in the older adult can be associated with significant morbidity:
  - Association between mild anemia and impaired performance based mobility function.
  - Association with impaired physical function, increased frailty, muscle weakness and falls.
  - Association with impaired cognitive performance, depressive symptoms, reduced quality of life.

Source: http://www.uptodate.com/contents/anemia-in-the-older-adult
Complex Case Studies: Cerebrovascular Disease & Cognitive Impairment

David W. Lovejoy, Psy.D., FACPN
AVP & Director of Behavioral Health
Disability Medical/Vocational Department
MassMutual Financial Group

Depts. of Neurosurgery & Psychiatry, Hartford Hospital
Assistant Professor of Emergency Medicine & Traumatology
University of Connecticut School of Medicine
• What is Cerebrovascular Disease?
• How can these brain-related changes impact cognitive and emotional functionality?
• Case study considerations
Cerebrovascular Changes

Zlokovic and Apuzzo, 1998
Risk Factors

"Would you like a bypass with that?"
Data from Seattle Longitudinal Study (Schaie, 2005);
Types of dementia

- Alzheimer's dementia (AD): 60%
- Vascular dementia (VaD): 15-20%
- Lewy Body dementia 10%
- Others including frontal lobe dementia, alcohol, CBG 10%
- Expected that VaD will become the most common form of dementia throughout the world
- Each for of dementia has its own stage of Mild Cognitive Impairment (MCI)
Alternative guidelines

- Memory criteria reflects an “Alzheimerization” of dementia
- AD presents with early, severe memory impairment, other dementias may not
- Alternative is impairment in multiple domains that impact daily function
Vascular Cognitive Impairment Continuum

Risk Factors:
- Age
- Obesity
- Diabetes
- HTN
- Hypercholesterolemia
- CAD
- Smoking

Presence of cerebrovascular disease accounts for about one third of the risk for Dementia of the Alzheimer’s Type.
“A syndrome where there is evidence of clinical stroke or subclinical vascular brain injury and cognitive impairment affecting at least one cognitive domain.”
Left MCA Territory Infarct
Small Vessel Disease & Lenticulostriate Arteries (coronal image)
LA on Magnetic Resonance Imaging

From Malloy et al, 2006
Location of Infarct/Cognitive Reserve?
Small Vessel Disease

- White matter abnormalities
- White matter lesions
- White matter changes
- Small vessel disease
- Small vessel ischemic disease
- Microangiopathy
- Leukoariosis
- Small infarcts
- T2 flair hyperintensities
- Silent strokes
- Non-specific white matter changes
Small Vessel Disease

- Frontal lobe deficits
- Executive dysfunction
- Inattention
- Depressive mood changes
- Changes in gait
- Parkinsonism
- Memory impairment is often less pronounced
  - More sub-acute course
23% of lacunar infarct patients developed dementia within four years, which represented a 4-12 fold increase in risk relative to controls. Many strokes considered silent.

Loeb et al., *Stroke*, 1992; 29: 1225
Case 1

- 55–year-old male applying for lifetime benefits at the best rate, with home health care.
- Physician, actively working
- MD degree
Case 1

• Medical Hx:
  – Present BMI = 33 (past 3 years)
  – BMI of 35-38 previously
  – Treated hypercholesterolemia past 13 years
  – No history of hypertension
  – Past smoker, abstinent past 5 years.
Case 1

- Psychiatric History
  - Diagnosed with “depression” 4 years ago
  - Followed a divorce
  - Treated with Zoloft with good symptom remission
  - No evidence of breakthrough symptoms since
  - No indication of functional decline due to sx
Case 1

• Cognitive

– Notes some problems paying attention. Have been more noticeable because under stress.
– MMSE = 30
– Neuropsych = decreased processing speed and attention (grp 2)
Case 1

- Suffered a “significant headache” three years ago while exercising at a gym. Accompanied by nausea. Saw neurologist who suspected a migraine.
- MRI was ordered. Final impression = normal.
- Body of report = Scattered T2 hyperintensities measuring 1mm-3mm
Case 2

• 65-year-old female (sister of agent)

• Applying for lifetime benefits at the best rate, with home health care.

• Working part-time as a librarian

• Master’s degree in library sciences
Case 2

• Medical Hx:
  – History of controlled hypertension x10yrs
  – History of hypercholesterolemia
  – BMI = 24
  – No hx of smoking
Case 2

- Psychiatric History:
  - First Episode of depression age 63
  - Out of the blue
  - Diagnosed as MDD, single episode, moderate
  - Took several weeks off of work
  - Sx controlled with SSRI
Case 2

• Cognitive:
  – Notes more forgetful over past 2 years
  – Some difficulties noted with word finding
  – Thinking feels a little slower
  – PCP attributes to depression
  – MMSE = 30
  – Neuropsych: Mild weaknesses in processing speed, retrieval and executive functions. (Grp 2)
Case 2

- MRI: Impression = Normal MRI
  - Body of Report = scattered areas of confluent T2 hyperintensities particularly in the periventricular white matter.
Underwriting Considerations

- Not all cerebrovascular disease is an LTC risk
- Pay attention to subjective complaints
- Consider age
- Consider education
- Obtain Medical Records
  - MRI reports (report body and reason for referral)
  - Consider location and extent of white matter lesions
  - Consider size of lesions
  - Consider presentation (punctate, linear, confluent)
  - Pay attention to mention of atrophy
  - Progression across MRI studies
  - Consider comorbid vascular risk factors and their severity
- Consider late life depression as a unique entity
- Consider a cognitive screen, but be familiar with its strengths and weaknesses
- Involve your medical resource