Multiple Myeloma Awareness, Diagnosis, and Disparities

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OBJECTIVES/ OVERVIEW

• What is Multiple Myeloma?
• Incidence in African Americans
• Testing for Multiple Myeloma
• Treatment and Improved Survival
• Ethnic Disparities in Myeloma
• Community Education of Myeloma
• Conclusions
What is Multiple Myeloma?

- Multiple myeloma is a cancer of the plasma cells that reside in the bone marrow.
- Plasma cells normally produce proteins called immunoglobulins (Ig) or antibodies.
- Ig help to destroy foreign bodies such as bacteria.
Introduction
What is Multiple Myeloma?

- What is Multiple Myeloma?
  - When these plasma cells become malignant they make excessive amounts of Ig.
  - These myeloma antibody proteins are called Monoclonal protein or M-protein.
Signs and Symptoms of Multiple Myeloma

- Tire more easily and feel weak
- Bone pain from the myeloma cells in the marrow
- Fractures may occur as a result of the holes bones (Lytic lesions)
- Anemia (low red blood)
- Recurrent bacterial infections
- Confusion from high blood calcium or kidney failure
African Americans have the highest risk of myeloma of any race/ethnic group in the world.

Incidence in older black males and females was 126% greater than the incidence in similar age white males and females in 2010.

22,350 new cases of multiple myeloma were diagnosed in the United States in 2013.

African Americans have more than twice the myeloma incidence rate of whites. 12 vs. 5 per 100,000 population.

African Americans have the highest risk of myeloma of any race/ethnic group in the world.

Incidence in older black males and females was 126% greater than the incidence in similar age white males and females in 2010.
Incidence of myeloma increased with age. – Median age at diagnosis for AA is 66 years.

The highest incidence rates are found in African American males older than 85 years of age.

From 2006 to 2010, myeloma was the 8th most common cancer among African Americans males.

7th most common cancer among African Americans females.

Incidence of myeloma increased with age.

The highest incidence rates are found in African American males older than 85 years of age.
Why do African-Americans have a High Risk for Myeloma?

- No conclusive evidence for multiple myeloma being hereditary.
- Exposure to ionizing radiation, pesticides, and materials from manufacturing occupations are associated with multiple myeloma.
- The racial difference in incidence cannot be explained by...
  - Obesity
  - Tobacco or Alcohol use
  - Dietary preferences
  - Vitamin intake
  - Family history of myeloma
  - Socioeconomic Status

Examining Tumor Genetics to Explain Differences in Incidence

- Cytogenetic data of patients from 2 large myeloma studies were examined.
  - Tumor genetics between African Americans and Whites were similar except for a lower frequency of IgH translocations (40% vs. 52%; p=0.032) in AA patients.

- No clear tumor biology differences.
- Limited samples from African-Americans (4-16%) with multiple myeloma!
Could My Patient Have Myeloma? 
*Think B.A.C.K*

- **B** - Bone pain from the effects of myeloma cells on the marrow.
- **A** - Anemia (low red blood)
- **C** - high blood calcium or confusion
- **K** - Kidney function is poor
Q: Where Do We Start Looking?

A: Monoclonal Protein!
Serum Protein Electrophoresis
Monoclonal Gammopathy

Monoclonal protein

Albumin
α Zone Proteins
β Zone Proteins

Monoclonal Plasma Cells

Lightest

Heaviest

Monoclonal gammopathy

alb α₁ α₂ β γ
Serum Protein Electrophoresis
Monoclonal Gammopathy *Light Chain*

Urine Protein Electrophoresis to Detect Monoclonal Light Chains
**Light Chain Monoclonal Gammopathy**

- In 17% of patients with myeloma only produce a light chain.
  - Concentrations too low to be detected by routine serum immunofixation.
  - Can be found either 24-hr urine collection for UPEP or a blood test for the Serum Light Chain Analysis.

- A sensitive assay for immunoglobulin free light chains (FLC) in the serum is available.
  - Several studies have shown the serum FLC test equivalent or superior to the 24-hr urine collection.

- The FLC assay has proven value in diagnosis, prognosis, and response to treatment MGUS, amyloid, and multiple myeloma.
  - National Comprehensive Cancer Network guidelines require a light chain measurement in the myeloma evaluation.

- **Either** do a 24-hr urine collection for protein electrophoresis **or** serum FLC assay.
• Serum FLC assay uses κ and λ polyclonal antibodies against specific epitopes that are hidden in intact immunoglobulins but exposed on FLCs.

• FLCs independently quantify the two isotypes.

• Monoclonality can be identified by the demonstration of an abnormal ratio of κ : λ FLCs.

Light Chain Monoclonal Gammopathy

Ratio: 1.02

Normal
with inflammation

Kappa Lt. Chain  Lambda Lt. Chain
Light Chain Monoclonal Gammopathy

Ratio: 100

Positive Monoclonal Serum Light Chains

Normal with inflammation
Do BOTH the SPEP and Light Chain Tests!

If you are working up a patient for myeloma…

You Really Should!

Please, please!

I WOULD STRONGLY RECOMMEND!

Check an SPEP and some type of light chain measurement (UPEP or FLC assay)!

If you check an SPEP only, 17% of your myeloma patients will NOT BE DETECTED!
Biopsy or Not to Biopsy, That is the Question

• A bone marrow aspirate and biopsy should be performed on patients with monoclonal gammopathies with any one of the following risk factors:
  – IgG M-protein ≥1.5 g/dl
  – Any M-protein with IgA or IgM
  – Abnormal serum FLC ratio
  – Clinical suspicion of malignant plasma cell disorder.
    • HyperCalceemia, Renal failure, Anemia, lytic Bone lesions.
  • CRAB
Monoclonal Gammopathy of Undetermined Significance

- Monoclonal Protein < 3g/dL
- Little or no light chain M-protein
- < 10% plasma cells in BM
- No CRAB
Monoclonal Gammopathy of Unknown Significance

MGUS is found in 2% of persons > 50 years and 3% > age 70.

The prevalence of MGUS was twice as high in black men compared with white men (14.8% versus 7.8%).

Overall risk of progression is 1% per year.

Higher rate of progression in:
- High initial M-protein, IgM or IgA subtypes or positive FLCs.

No increased progression rate based on race.
Diagnosis of Multiple Myeloma

- Conventional X-rays reveal punched-out lytic lesions, osteoporosis, or fractures in 75% of patients.
- Radionuclide bone scans are of NO value.
- FDG PET/CT appears to be more sensitive (85%) than skeletal survey for the detection of small lytic bone lesions.
- Diagnosis is confirmed with bone marrow demonstrating greater than 10% involvement by malignant plasma cells.

Evaluation of Monoclonal Gammopathies

SPEP (with Immunofixation), UPEP or serum FLC assay

Skeletal Survey
CBC, Creatinine, Calcium

Bone Marrow Biopsy
Advancements in Multiple Myeloma Biology

• Until 1997, therapy for multiple myeloma was limited to chemotherapy.
  – Only 30% of people responded.
  – Average survival was 2 years.

• Research into the **science** of how multiple myeloma grows has resulted in **targeted** treatments which selectively destroy the cancer cells.
  – Immunomodulatory therapy
    • Thalidomide, Lenalidomide, Pomalidomide
  – Proteasome inhibitors
    • Bortezomib, Carfilzomib
Advancements in Survival from Multiple Myeloma

- With new biology based medications response rates are now 91 to 98%.
- Survival has more than doubled in myeloma patients to over 6.1 years!
- When novel therapies are used at diagnosis, survival is improved dramatically.
  - From 3.8 years to 7.3 years!

Myeloma is not curable. But is survivable!

Ethnic Disparities in Myeloma Treatment; Impact of Novel Therapies

• New therapies and clinical trials have improved the survival for Caucasians with myeloma from 1993–97 to 2003–07.

• Smaller improvements have occurred for other racial/ethnic groups.

• The mortality rate for myeloma from 2006 to 2010 for black males was nearly double the rate for white males.

Years of life gained with new therapies for multiple myeloma

1.3

0.8

0.7

0.5

White

Black

Hispanic

Asian

Ethnic Disparities in Myeloma Treatment; Barriers

What are the barriers to more timely diagnosis, treatment, and survival with the new medications for multiple myeloma?

- Lack of awareness about research
- Lack of access
- Fear
- Distrust
- Cultural beliefs
- Lack of access to facilities that are performing research

Strategies for the prevention or screening multiple myeloma:

Education and Awareness of Multiple Myeloma

Cancer 2008 112(3):447–454
In 2010 Mayo Clinic-Jacksonville partnered with African American churches to provide educational programs focused on myeloma awareness, cancer research and healthy behaviors.

Despite 88% having a primary care provider:
- 67% of participants had never received information on multiple myeloma.
- 57% never received clinical research study information.
- Most participants would enroll in clinical trials if asked.

At the 2013 African American Sankofa Health and Wellness Forum in Milwaukee, WI 88% of participants were unaware of multiple myeloma.
Community Education of Multiple Myeloma; Southeastern Wisconsin

• The Jane Cremer Foundation is a not-for-profit in Southeastern Wisconsin with its mission to...

• **Educate and Empower** women to be proactive in the prevention, diagnosis and treatment of cancer.

• With two African American church based educational events, nearly 400 people were informed of:
  – Increased incidence of multiple myeloma in their community.
  – How to empower themselves to seek out the newest treatments and clinical trials.
  – Healthy life style activities.
The Keys to Myeloma Education and Empowerment in the Ethnic Community

Breakdown the Barriers

• Bring the education to the community.
• Begin with the basics.
  • Do not use terms to challenge anyone’s Health Care Literacy.
• Stress purpose of any myeloma education in the community is not “medical” or “scientific” but is “educational”.

The Keys to Myeloma Education and Empowerment in the Ethnic Community

Empower Your Audience!

- **Educate patient empowerment.**
  - To teach about multiple myeloma is **not** enough.
  - People need to be given “permission” to…
    - Ask their doctor questions.
    - To question their doctor.
  - Educating communities on the importance of cancer research as an **empowerment tool**.
  - Deliver information necessary for racial and ethnic groups to “break-through” the social/economic barriers.
    - Resources in the community.
    - Overcome “health care illiteracy”.

- **Educate the community providers (RNs, MDs, PAs, etc…)**

Conclusion

- The multiple myeloma is common hematologic (blood) cancer of the plasma cell in the bone marrow.
- It is **twice** as common in African Americans that all other racial and ethnic groups.

- The best method of detection is public and provider **KNOWLEDGE** of multiple myeloma.
- Screening test for myeloma include testing for a Monoclonal protein.
  - Serum Protein Electrophoresis
  - 24 hour Urine Protein Electrophoresis or Serum Free Light Chains
- Advances in science through clinical trials have improved the detection, diagnosis, and treatment of multiple myeloma.
  - Resulting in **longer** and **better lives** for all myeloma patients.
Learn More and Educate Others

– The Leukemia & Lymphoma Society: www.lls.org
– Multiple Myeloma Research Foundation: www.themmrpf.org
– International Myeloma Foundation: www.myeloma.org
– National Cancer Institute: www.cancer.gov

Thank You!
For Your Time and Attention
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