



THE UNIVERSITY OF TEXAS
MD Anderson
~~Cancer Center~~

Making Cancer History®

Incidence, Symptomatology and Mortality of Spontaneous Intracerebral Hemorrhage in Oncologic Patients Presenting to the Emergency Department

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Disclosure of Commercial Relationships

- Adriana H. Wechsler, MD

- NO FINANCIAL COI TO DISCLOSE

Etiology of spontaneous intracerebral hemorrhage (sICH)

- **Hypertension (most common)**
- **Amyloid angiopathy (rising incidence with aging population)**
- Hemorrhagic ischemic stroke
- Aneurysm
- Arteriovenous malformation
- Venous angioma
- Dural venous sinus thrombosis
- Vasculitis
- Medications, e.g. oral anticoagulants
- Coagulopathy
- Hypertension and amyloid angiopathy combined account for 78-88% of cases of sICH in the general population

Incidence & Mortality of sICH -General Population

- By admission to US hospitals

DEADLY & MORBID

- 21 per 100 K person-years (1998-2008: 63,000)

- 34% in-hospital mortality (1984-2008)

– Rincon, Neurocrit Care, 2013

- One month case fatality ratio 35%; one year case fatality ratio 59%

--Sacco, Stroke 2009

- From pooled worldwide studies

- 25 per 100 K person-years

- 40% median case fatality at 1 month

– van Asch, Lancet Neurology, 2010

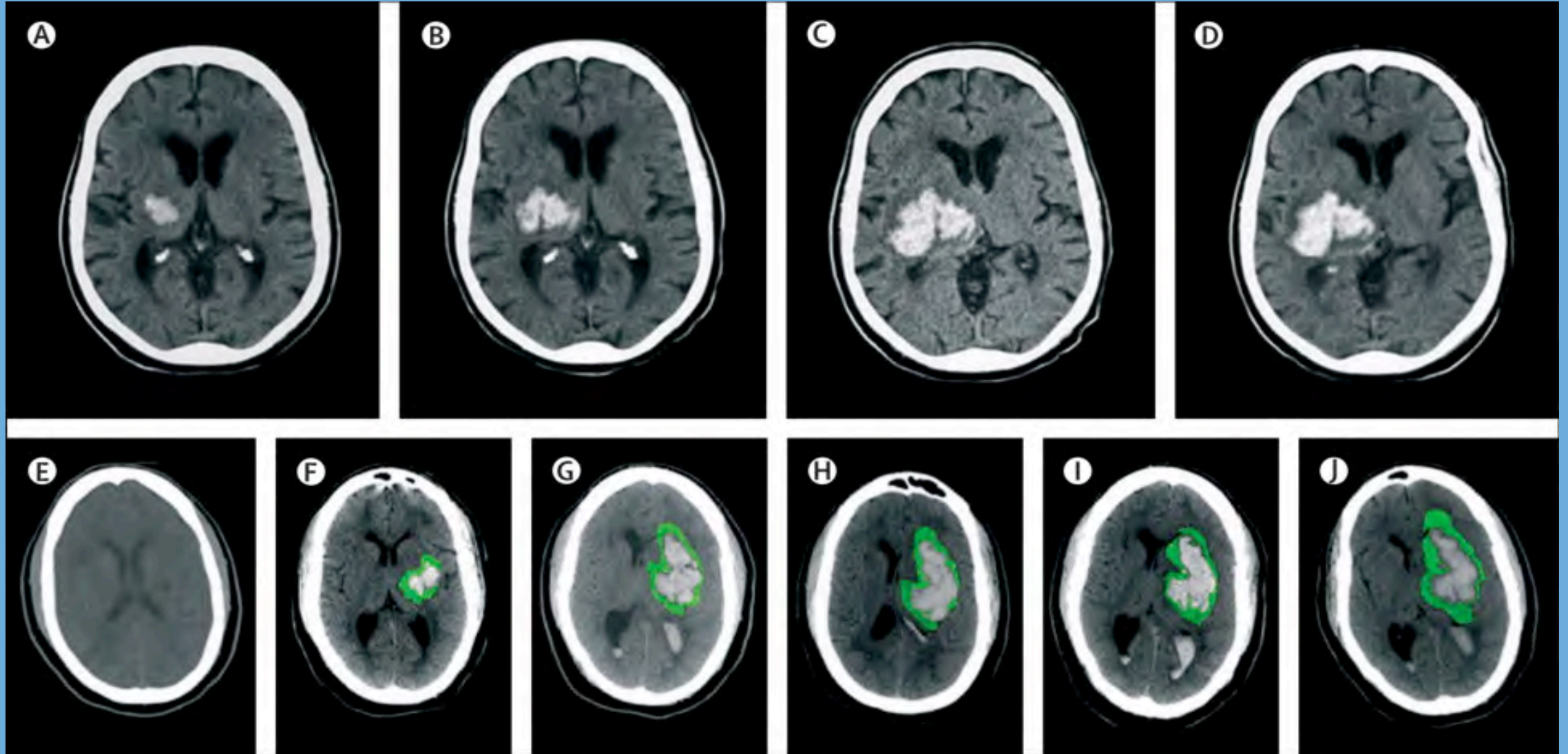
- Of those who survive, only 12-39% achieve functional independence

sICH: Not just Fatal, Rapidly Fatal

- Of those who die, half do so within the first 48 hours
- Rapid hematoma expansion occurs within the first 4 hours

-Quereshi, Lancet Neurology, 2009

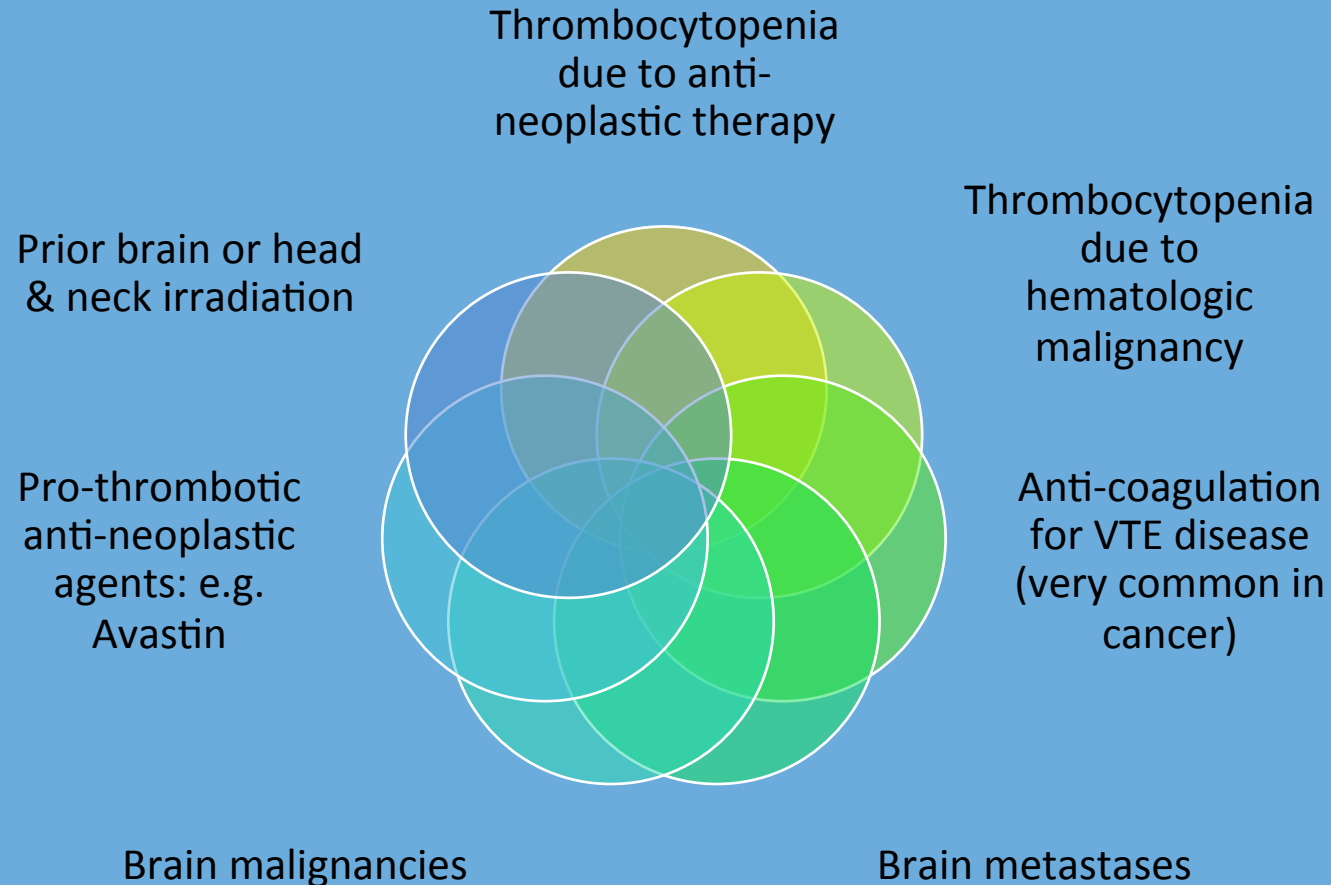
Hyperacute Hematoma Expansion



What about the cancer patient???



Increasing the risk of sICH in patients with cancer



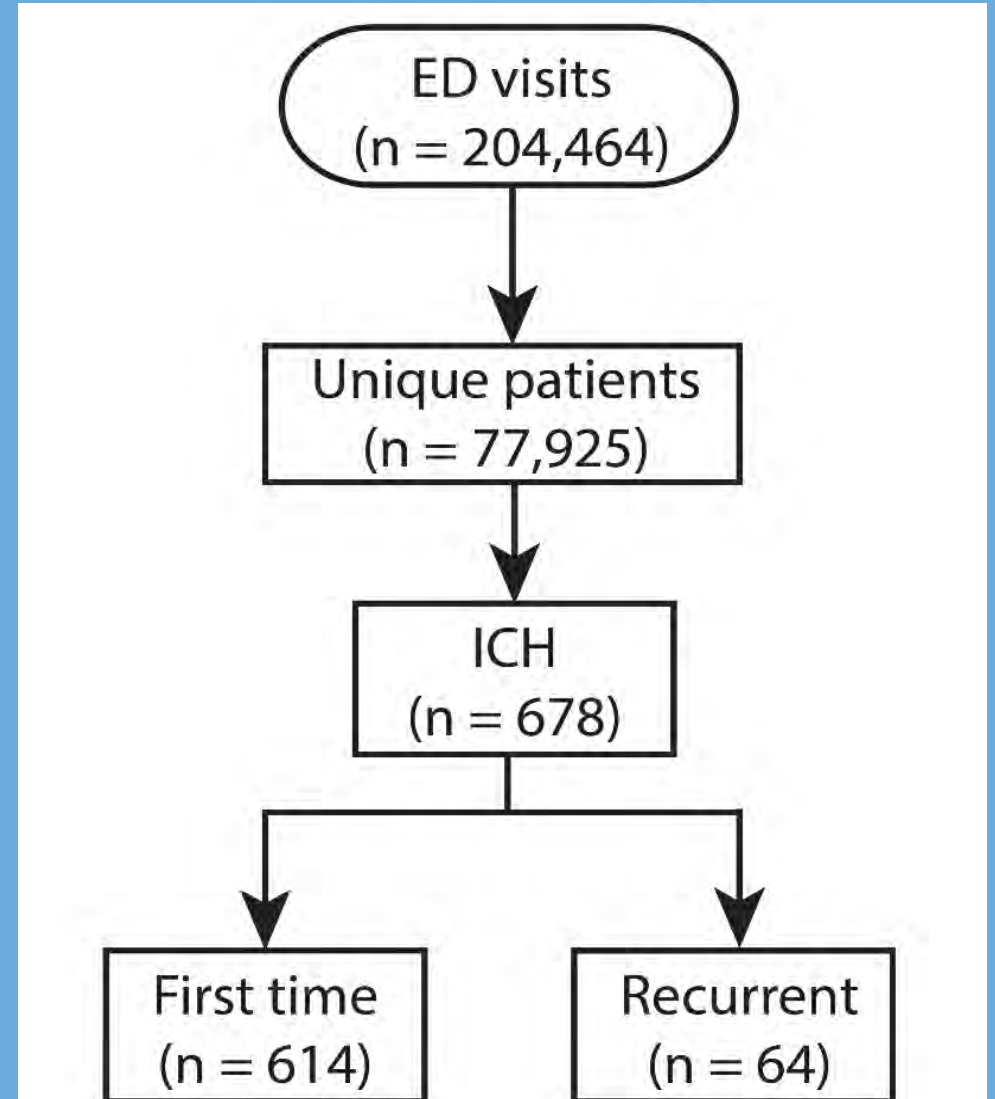
MD Anderson Emergency Department

- 650 bed hospital
- 27,000 ED visits per year
- 73 patients/day
- 98% with cancer
- 51% admission rate
- 43% of inpatients thru ED



What about the patient with cancer?

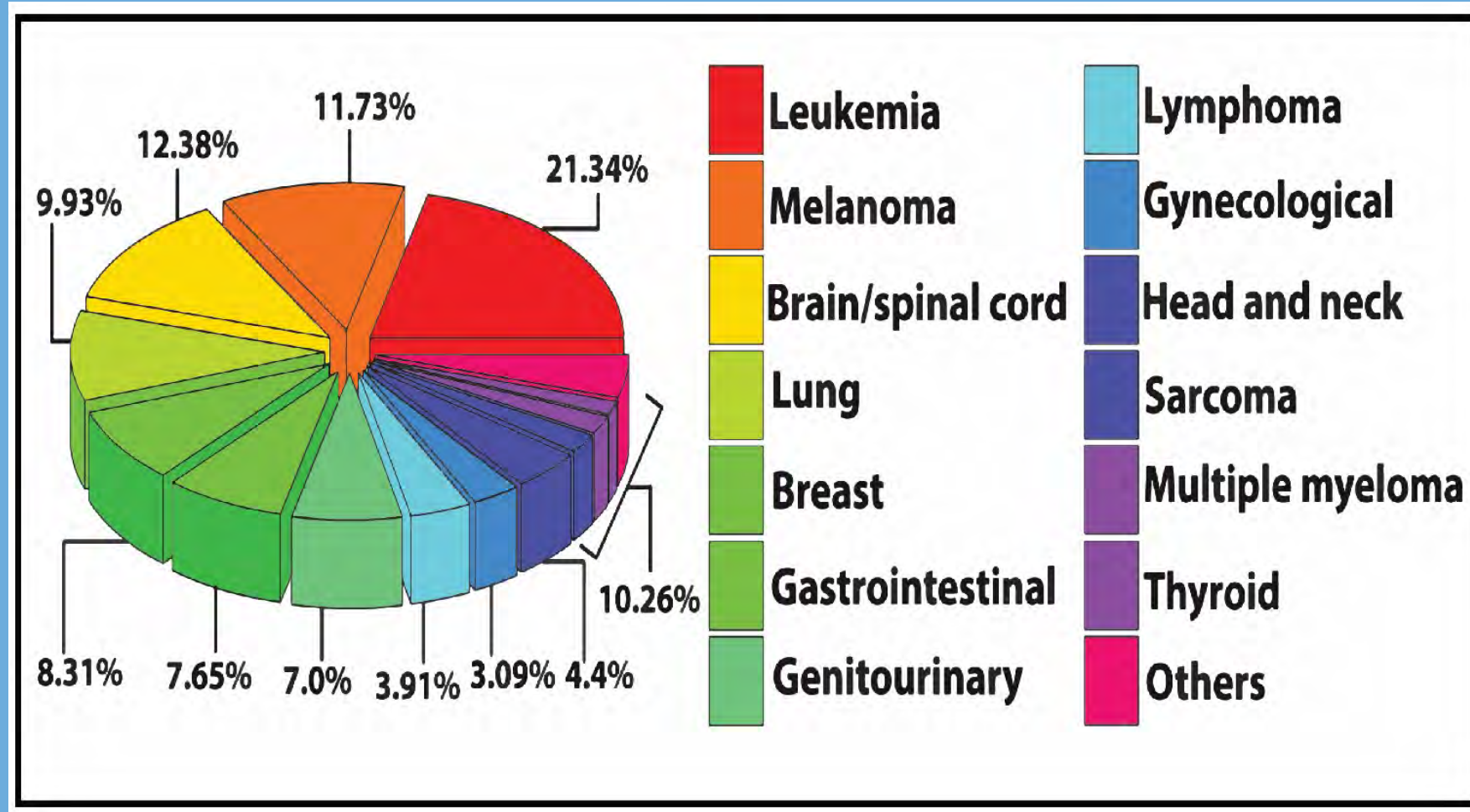
- Retrospective cohort study
- 10-year period 2006-2016
- ICD-9 and ICD-10 codes
- 678 (0.33%) of all ED visits
- 0.79% of unique patients



Which Cancers? Which Symptoms? What Risk Factors?

- Melanoma, choriocarcinoma, thyroid cancer, RCC adrenal cell cancer most common metastases to bleed in the brain
 - Manybur, Neurology, 1977; Wakai, Neursurg, 1982
- Other primary tumors, such as lung, breast are less likely to cause sICH
 - Gerber, J Clin Oncol, 2006; Srivastava, J Thoac Oncol, 2009

Percentage of sICH by cancer type



Incidence of sICH in ED by cancer type

Three most common overall:

1. Brain & spinal cord
2. Melanoma
3. Leukemia

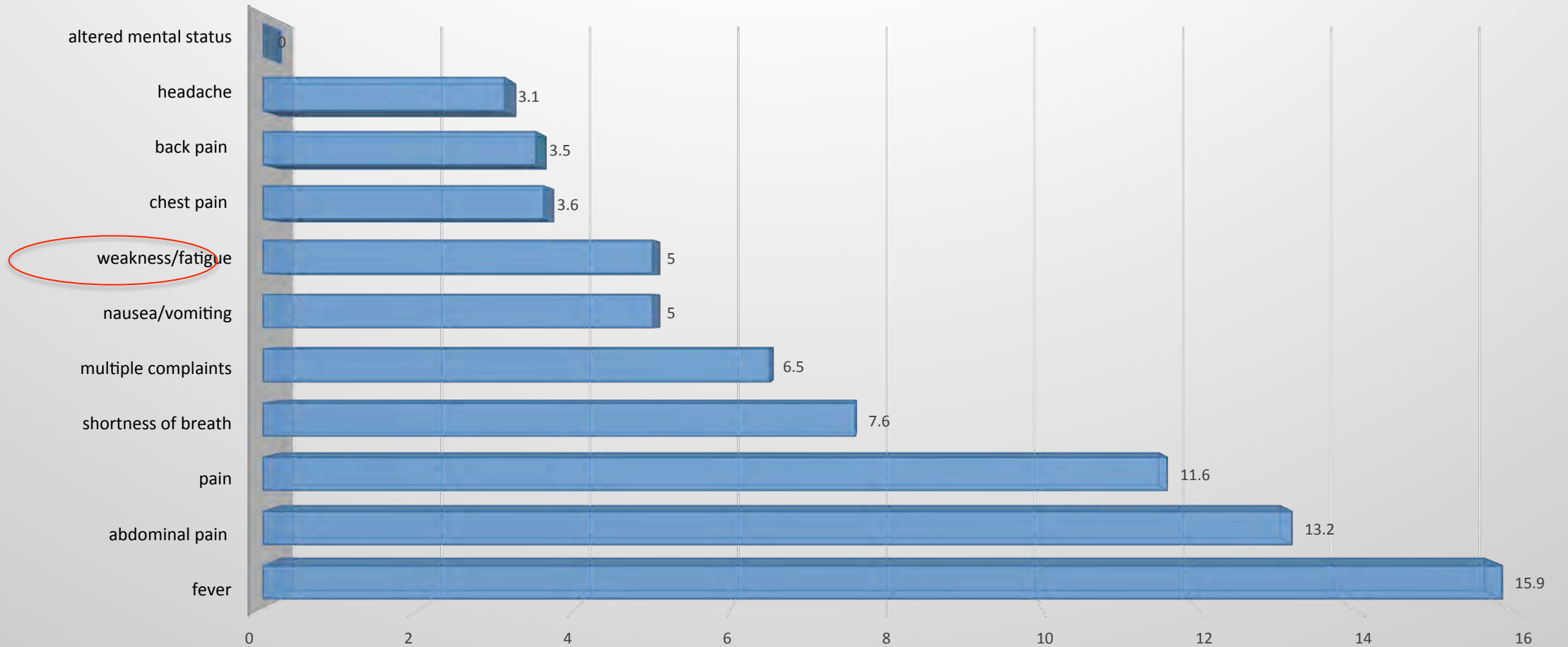
Most common solid tumors:

1. Melanoma
2. Lung
3. Thyroid
4. Breast

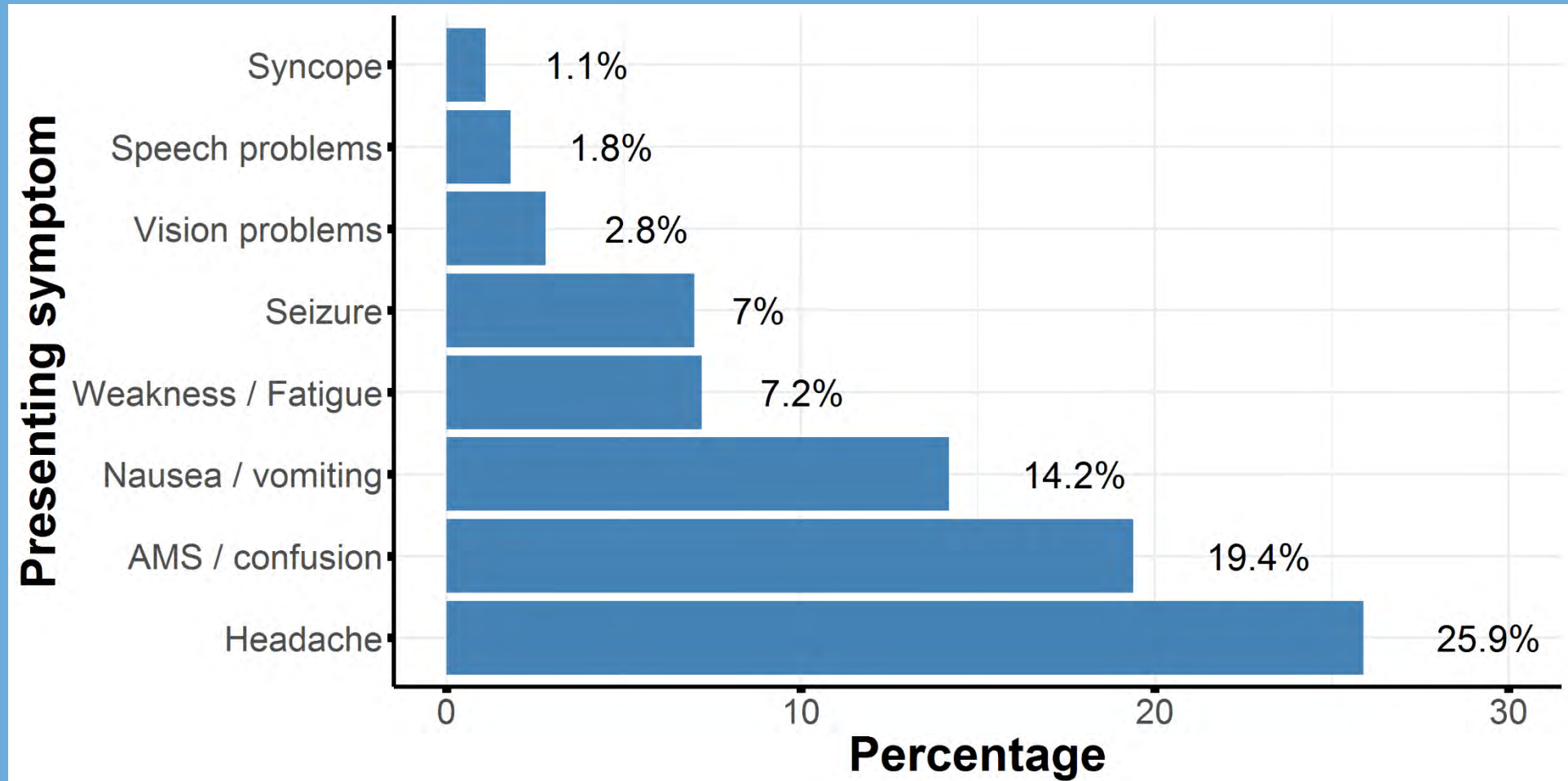
Cancer type	Number of patients	ICH (Incidence)
Total	77925 (100.0%)	614 (0.79%)
Leukemia	7231 (8.78%)	131 (1.81%)
Melanoma	2272 (2.76 %)	72 (3.17%)
Brain and spinal cord	2343 (2.85 %)	76 (3.24%)
Lung	7941 (9.64 %)	61 (0.77%)
Breast	9039 (10.98 %)	51 (0.56%)
Gastrointestinal	13621 (16.54%)	47 (0.35%)
Genitourinary	7415 (9.00 %)	43 (0.58%)
Lymphoma	5541 (6.73%)	24 (0.43%)
Gynecological	5035 (6.11%)	19 (0.38%)
Head and Neck	5823 (7.07%)	27 (0.46%)
Sarcoma	2877 (3.49%)	13 (0.45%)
Multiple Myeloma	1792 (2.18%)	12 (0.67%)
Thyroid	1192 (1.45%)	9 (0.76%)
Other cancer types	5803 (7.05%)	29 (0.50%)

Most common complaints to our Cancer Center

percentage



sICH: Presenting Symptoms



Mortality in patients presenting to the ED with sICH

Cancer type	Mortality			
	7 days mortality	14 days mortality	30 days mortality	One year mortality
Total	73 (11.89 %)	101 (16.45%)	149 (24.27)	389 (63.36%)
Leukemia	25 (19.08%)	33 (25.19%)	46 (35.11%)	86 (65.65%)
Melanoma	8 (11.11%)	8 (11.11%)	18 (25%)	57 (79.17%)
Brain and spinal cord	5 (6.58%)	6 (7.89%)	11 (14.47%)	39 (51.32%)
Lung	5 (8.2%)	10 (16.39%)	13 (21.31%)	48 (78.69%)
Breast	6 (11.76%)	9 (17.65%)	13 (25.49%)	28 (54.9%)
Gastrointestinal	7 (14.89%)	10 (21.28%)	12 (25.53%)	30 (63.83%)
Genitourinary	5 (11.63%)	7 (16.28%)	10 (23.26%)	23 (53.49%)
Lymphoma	1 (4.17%)	1 (4.17%)	3 (12.5%)	16 (66.67%)
Gynecological	0 (0.0%)	2 (10.53%)	2 (10.53%)	11 (57.89%)
Head and Neck	2 (7.41%)	4 (14.81%)	5 (18.52%)	15 (55.56%)
Sarcoma	1 (7.69%)	1 (7.69%)	2 (15.38%)	8 (61.54%)
Multiple Myeloma	4 (33.33%)	6 (50%)	8 (66.67%)	9 (75%)
Thyroid	0 (0.0%)	0 (0.0%)	1(11.11%)	5 (55.56%)
Other cancer types	4 (13.79%)	4 (13.79%)	5 (17.24%)	14 (48.28%)

sICH-related mortality in solid versus liquid tumors

one month $p < 0.001$; one year $p = 0.377$

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Why this study?

- It is assumed that cancer patients have a higher incidence and higher mortality from ICH due to their increased risk factors: namely, coagulopathy, thrombocytopenia, brain metastases and prior brain radiation
- Nihilistic approach: Over 68% of patients with ICH dying within one month had been made DNR, cause of death was withdrawal of care
- Are these assumptions correct?
- How aggressive should we be in managing these patients; how can we rapidly identify them
- The first four hours following a bleed, the emergency department hours, are the golden hours to intervene in limiting hematoma expansion

Spontaneous ICH in General Population: **DEADLY**

- One month case fatality ratio is 34.6% -Sacco, Stroke, 2009
- One year case fatality ratio is 59% -Sacco, Stroke, 2009

Spontaneous ICH in Cancer Population: **Initially LESS DEADLY**

- 7 day mortality 12%
- 30 day mortality 24.7%

What can we conclude?

- Spontaneous ICH is a rare presentation, even in cancer patients. (.33%)
- Suspicion for ICH should be highest in patients with CNS tumors, melanoma and leukemia (solid tumors: melanoma, lung, thyroid, breast)
- The mortality at 1 month is not higher in cancer patients; more than three quarters live beyond the first month (except for liquid tumors)
- The mortality at 1 year may be higher than in the general population, but it cannot necessarily be attributed to the sICH
- Quantifying the incidence & mortality by cancer type can help guide diagnostic and therapeutic efforts when sICH is suspected.

Limitations

- All-cause mortality vs. case fatality
- Incidence vs. prevalence
- Denominator is not entire cancer population at risk
- Comparison studies: differing methodologies, populations, time frames
- Are we missing bleeds that were asymptomatic? or where diagnostic imaging was not obtained due to low suspicion by the clinician?

Further Study

- Are there predictive risk factors aside from symptoms



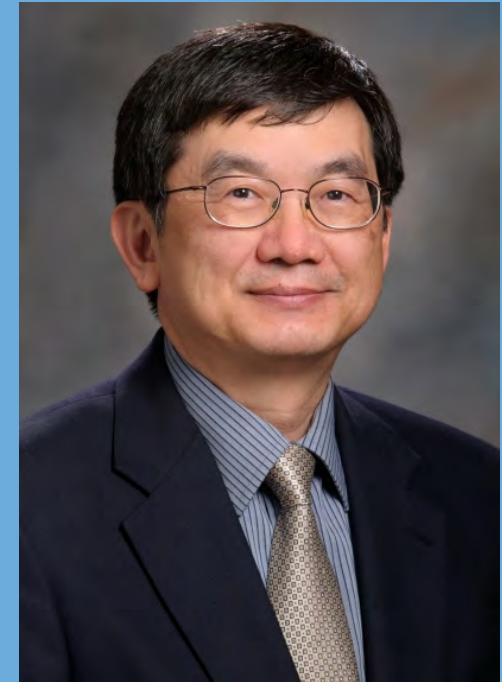
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My 7th Birthday Party in Vienna



Questions?