

Contrast vs Non-Contrast – When to Order

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Contrast media

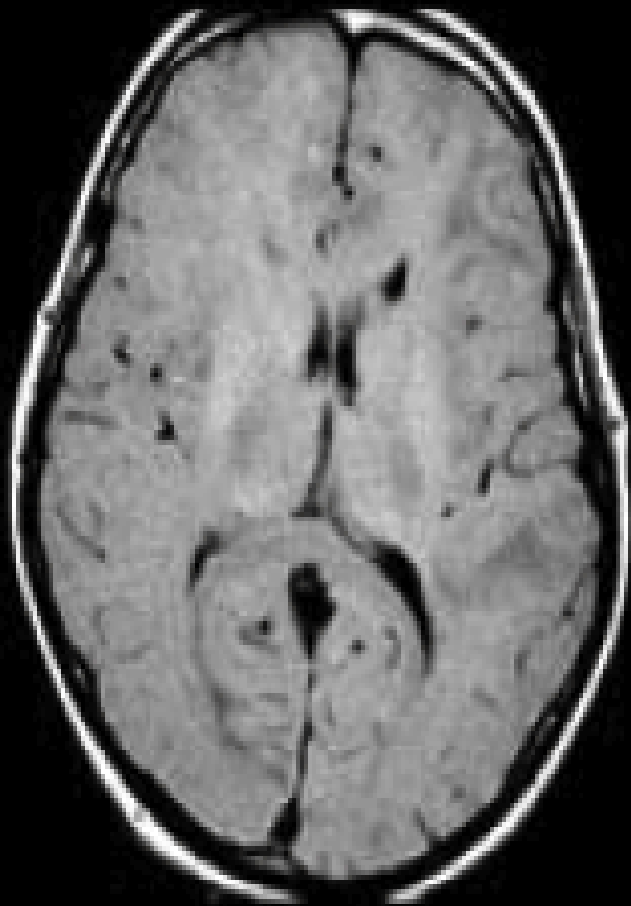
- Purpose of using contrast
- Contrast reaction
- Nephrotoxicity from contrast
- Nephrogenic systemic fibrosis
- When should contrast be used



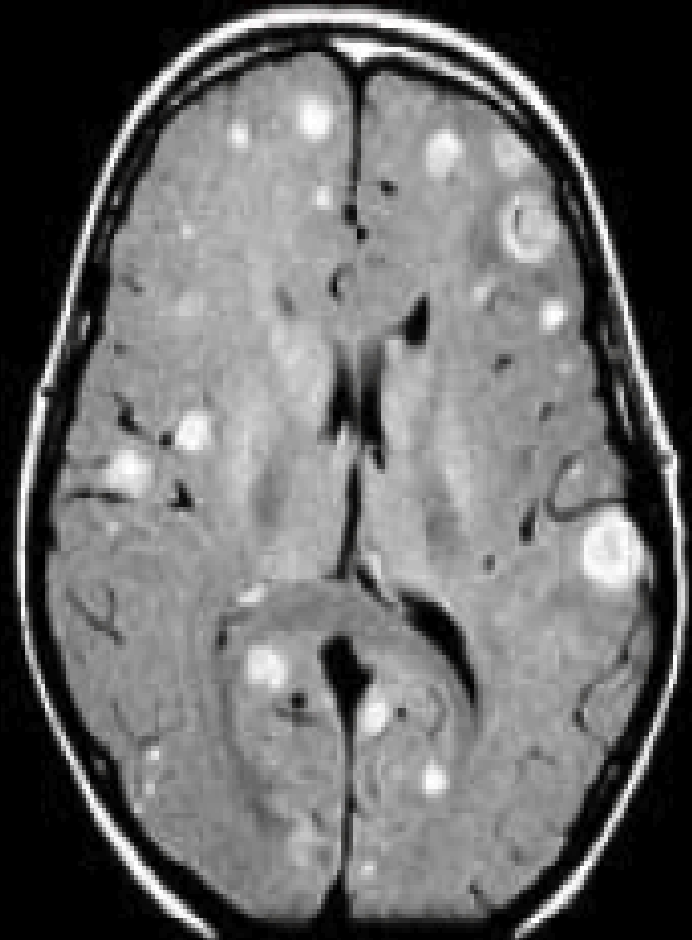
Purpose of using contrast

- Contrast media is used to enhance or create the necessary visual contrast in an image between the organ, vessel or tract in which they are present and the surrounding tissues in the body
- This makes it possible to visualize certain anatomical structures or physiological functions within the human body when the imaging techniques on their own cannot provide this information

A



B



Contrast reaction: risk factors

- Prior allergic reaction to contrast media
- Prior anaphylactic response to one or more allergens
- Asthma
- Significant cardiac disease (angina, CHF, severe aortic stenosis, primary pulm HTN, CM)
- Emotional state—reducing anxiety reduces severe adverse effects

Adverse contrast reactions:

Classification of adverse reactions

- Immediate (during examination)

Mild or minor reactions

Moderate or intermediate reactions

Severe reactions

Fatal reactions

- Delayed reactions
- Adverse effects at the injection site



MILD REACTION

- Nausea, vomiting
- Cough
- Warmth
- Headache
- Dizziness
- Shaking
- Altered taste
- Itching
- Pallor
- Flushing
- Chills
- Sweat
- Rash, Hives
- Nasal stuffiness
- Swelling of eyes, face
- Anxiety

MODERATE REACTION

- Tachycardia/ Bradycardia
- Hypertension
- Diffuse erythema
- Bronchospasm, wheezing
- Laryngeal edema
- Mild hypotension

SEVERE REACTION

- Convulsions
- Laryngeal edema: rapidly progressing
- Unresponsiveness
- Cardiopulmonary arrest
- Profound hypotension
- Clinically manifest arrhythmias

Delayed reactions

- May occur between 1 hour and 7 days after an inj.
- Usually self-limiting, cutaneous and not life threatening, can last up to a week

Injection site

- Local effect, caused by extravasation
- Thrombophlebitis

Shellfish allergy

- Urban legend
- There is no correlation of isolated shellfish allergy with allergic reaction to iodinated contrast.



Premedication: Adults

- For patients who are at risk for contrast reaction we prescribe oral prednisone
 - 50mg 13-22 hours prior
 - 50 mg at 7-12 hours prior
 - 50 mg 1 hour prior
- Steroids that are only given for 3 hours or fewer prior to contrast administration do not decrease adverse reactions

Premedication: Children

- 0.7 mg/kg Prednisone orally:
 - 13 hrs prior
 - 7 hrs prior
 - 1 hr prior
- 1 mg/kg Benadryl orally or IV 1 hr prior to exam

Risk Matrix and Premedication Indicator

Planned Administration of **Iodinated Contrast agents**

Previous Reaction to Allergens OTHER than Iodinated Contrast			
PREVIOUSLY RECEIVED CONTRAST WITHOUT INCIDENT			
	Mild	Moderate	Severe
Outpatient	None	None	None
Acute setting	None	None	None
NEVER RECEIVED CONTRAST OR WERE PREVIOUSLY PRE-MEDICATED			
	Mild	Moderate	Severe
Outpatient	None	None	Pre-medicate*
Acute setting	None	None	Pre-medicate*
SCHEDULE PATIENTS WITH A HISTORY OF SEVERE REACTION IN GALLOWAY, SP, HAMMONTON, BRICK, OR WALL ; NO WEEKENDS			
Previous Reaction to Iodinated Contrast***			
	Mild (Excluding hives/facial swelling/itching)	Moderate (Including hives/facial swelling/itching)	Severe
Outpatient	None	Pre-medicate*	Do not schedule
Acute setting	None	Pre-medicate*	Do not give Iodinated contrast**
Previous Reaction to Gadolinium Based Contrast			
	Mild	Moderate	Severe
Outpatient	None	Pre-medicate*	Pre-medicate*
Acute setting	None	None	Pre-medicate*
SCHEDULE PATIENTS WITH A HISTORY OF SEVERE REACTION IN GALLOWAY, SP, HAMMONTON, BRICK, OR WALL ; NO WEEKENDS			



Nephrotoxicity :

risk factors

- Preexisting renal insufficiency*
- Diabetes mellitus*
- Cardiovascular disease and use of diuretics
- Dehydration
- Age >70
- Myeloma
- Uncontrolled hypertension

* highest risk if both

Consequences of contrast induced nephrotoxicity

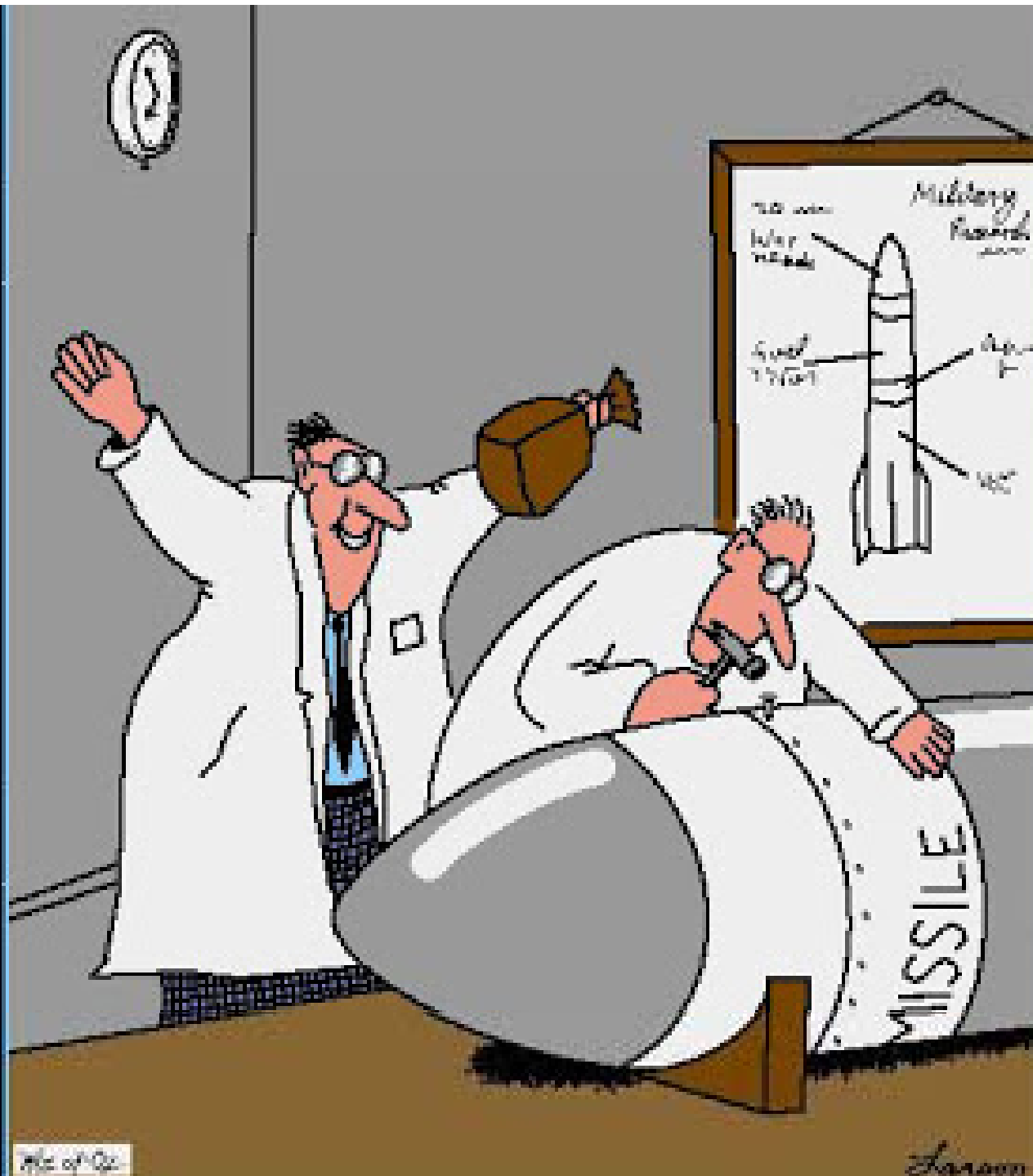
- Serum creatinine usually begins to rise in first 24 hours, peaks within 96 hours (4 days), and usually returns to baseline within 7-10 days
- It is rare for patients to require temporary or permanent dialysis

Prevention

- Normal renal function patients are at extremely low risk for contrast media-induced acute renal failure.
- Hydration, hydration, hydration!
- NO BENEFIT by using diuretics

Metformin-induced lactic acidosis

- Interaction between contrast media and metformin (glucophage) used in NIDDM
- Metformin is accumulates in renal insufficiency
- Potential development of fatal lactic acidosis
- AMI Policy: Patient can take Metformin day of exam, but must discontinue for 48 hrs after injection



Gadolinium

- Adverse reactions are much less common than with iodinated contrast media
- 20 million doses = 55 anaphylactic reactions
- Most reactions are mild such as nausea, headaches, pain at injection site
- Until the past few years, gadolinium was felt to be completely safe, even in pts with renal failure...

Nephrogenic systemic fibrosis

- Patients with impaired renal function are at risk for a serious side effect, nephrogenic systemic fibrosis (NSF) that occurs after the use of gadolinium
- IV gadolinium should not be used if creatinine clearance is <30

Nephrogenic systemic fibrosis

- Rare multisystemic fibrosing disorder that primarily involves the skin but may affect other organs in pts with renal insufficiency
- Usually seen in acute or chronic renal failure pts, many of which are on dialysis
- NSF can be fatal

FDA ALERT

FDA ALERT [6/2006, updated 12/2006 and 5/23/2007: This updated Alert highlights FDA's request for addition of a boxed warning and new warnings about risk of nephrogenic systemic fibrosis (NSF) to the full prescribing information for all gadolinium-based contrast agents (GBCAs) (Magnevist, MultiHance, Omniscan, OptiMARK, ProHance). This new labeling highlights and describes the risk for NSF following exposure to a GBCA in patients with acute or chronic severe renal insufficiency (a glomerular filtration rate <30 mL/min/1.73m²) and patients with acute renal insufficiency of any severity due to the hepato-renal syndrome or in the peri-operative liver transplantation period. In these patients, avoid the use of a GBCA unless the diagnostic information is essential and not available with non-contrast enhanced magnetic resonance imaging. **NSF may result in fatal or debilitating systemic fibrosis.**

Nephrogenic systemic fibrosis





When to use contrast

- Brain imaging
- Neck imaging
- Chest imaging
- Abdomen and pelvis
- Extremities/soft tissue masses

ACR.org

- Appropriateness criteria for many types of studies
- Go to web site ACR.org and click on Quality and Patient Safety
- Then click on ACR Appropriateness Criteria
- Can search for topics or see list of topics
- This will help in determining which types of radiologic studies need to be ordered for a certain condition
- OR.....just call us.

Brain imaging

- Most brain studies can be done without IV contrast.
- IV contrast is not recommended for head trauma, tia, cva.
- Do not use IV contrast for possible intracranial bleed.
- Use IV contrast for evaluating for neoplastic and infectious etiologies. Also, use for vascular malformations.
- In general, do not obtain a ct head with contrast without also obtaining a ct head without contrast.



**"Mr. Osborne, may I be excused?
My brain is full."**

Neck

- For most neck cases, IV contrast is indicated.
- For salivary gland calculi, ct neck without contrast should be ordered.

Chest

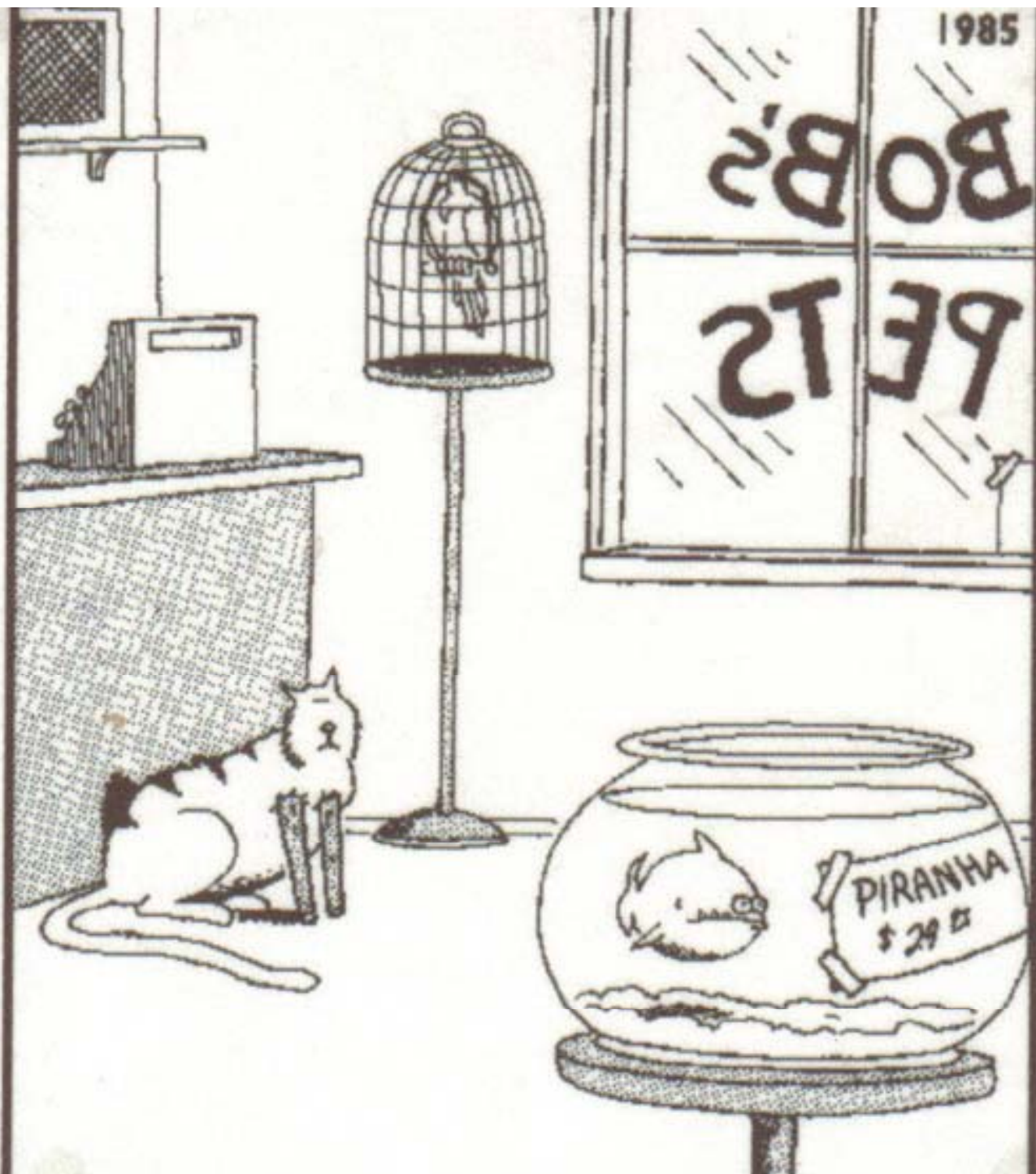
- For follow up of pulmonary nodules, do not usually need to use IV contrast.
- Most CT chest studies can be obtained without IV contrast.

Abd and Pelvis

- For renal colic, do not use IV contrast (or oral contrast) when ordering ct studies.
- Most abdomen and pelvis studies benefit from IV contrast.
- Consider with and without contrast studies for hematuria (painless), work up of hepatic and renal lesion(s).

Extremities

- For soft tissue masses, after x-ray, MRI is preferred study and IV contrast is recommended.
- For trauma, IV contrast is usually not indicated.
- When ruling out osteomyelitis, use IV contrast with MRI (not CT). Could also obtain 3 phase bone scan.



Insurance and pre-authorization

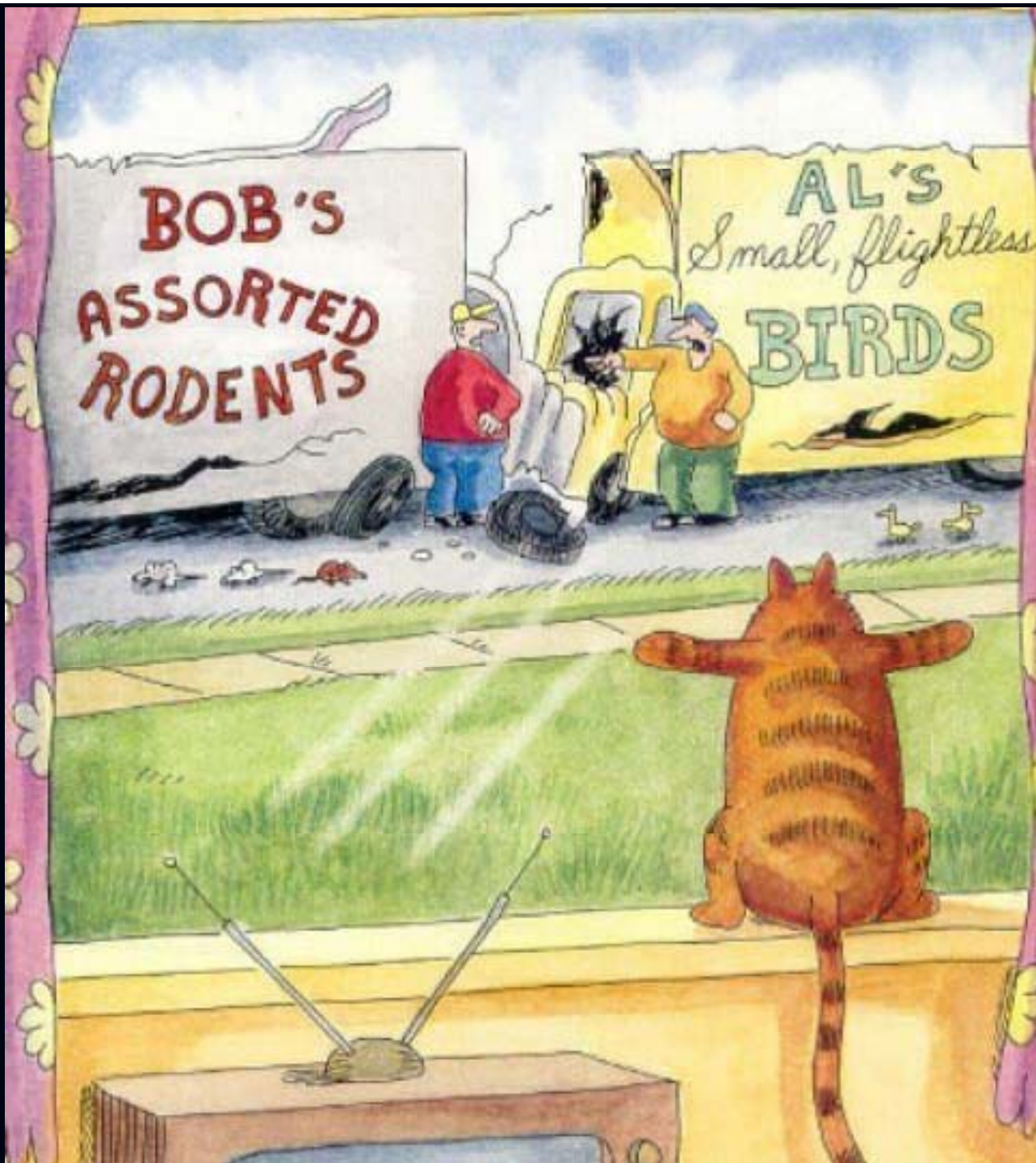
- For patients that need pre-auth, it is critical to get the correct study authorized ahead of time.
- Insurance companies will routinely deny payments for upgraded or downgraded studies.
- We may be able to obtain a new authorization at the time of study but it will require some leg work on our part and a new Rx from you.

Insurance and pre-authorization

- Example: A/P CT for pain, Rx written for w/o contrast, insurance approved without only. We cannot give them contrast unless the ins. co. approves upgrade and we have a new Rx.
- Example: MRI shoulder for pain, Rx written for w/o contrast, insurance approved for without only. We find a mass that requires contrast. We cannot give contrast unless insurance approved and there's a new script.

When to use contrast

- Every exam needs to be properly tailored to the patient.
- There has to be good communication between the referring physician and the radiologist.
- Good communication means getting a good history.
- Good communication also means that we may need to speak directly with each other to insure that the proper study is being done.



Questions?