

^{18}F -DOPA PET scan for Hyperinsulinism



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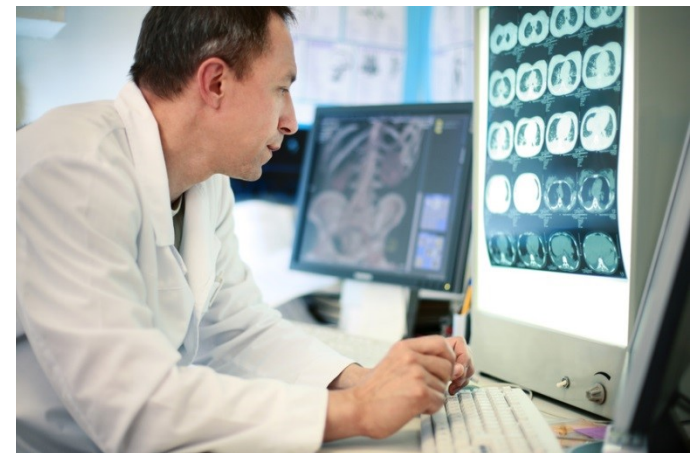
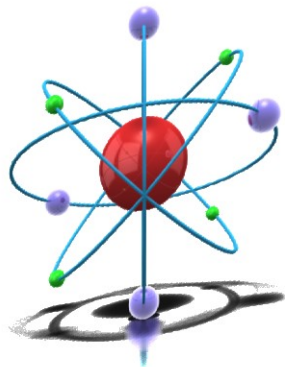
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What is a PET/CT scan?

Marriage of physiology and anatomy

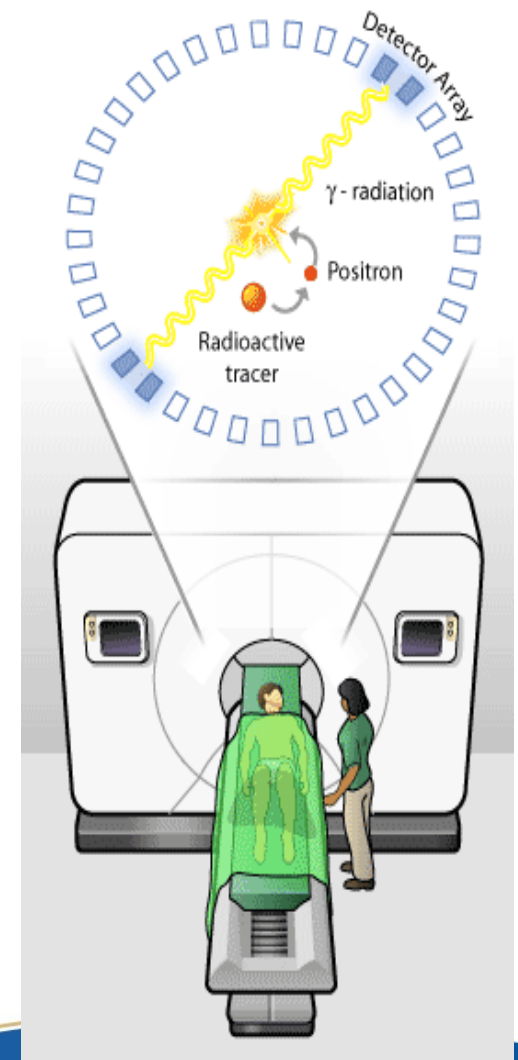
- ❖ Abnormal physiologic activity would be missed by other imaging exams such as MRI, CT, x-ray and ultrasound.



What is a PET scan?

PET = positron emission tomography

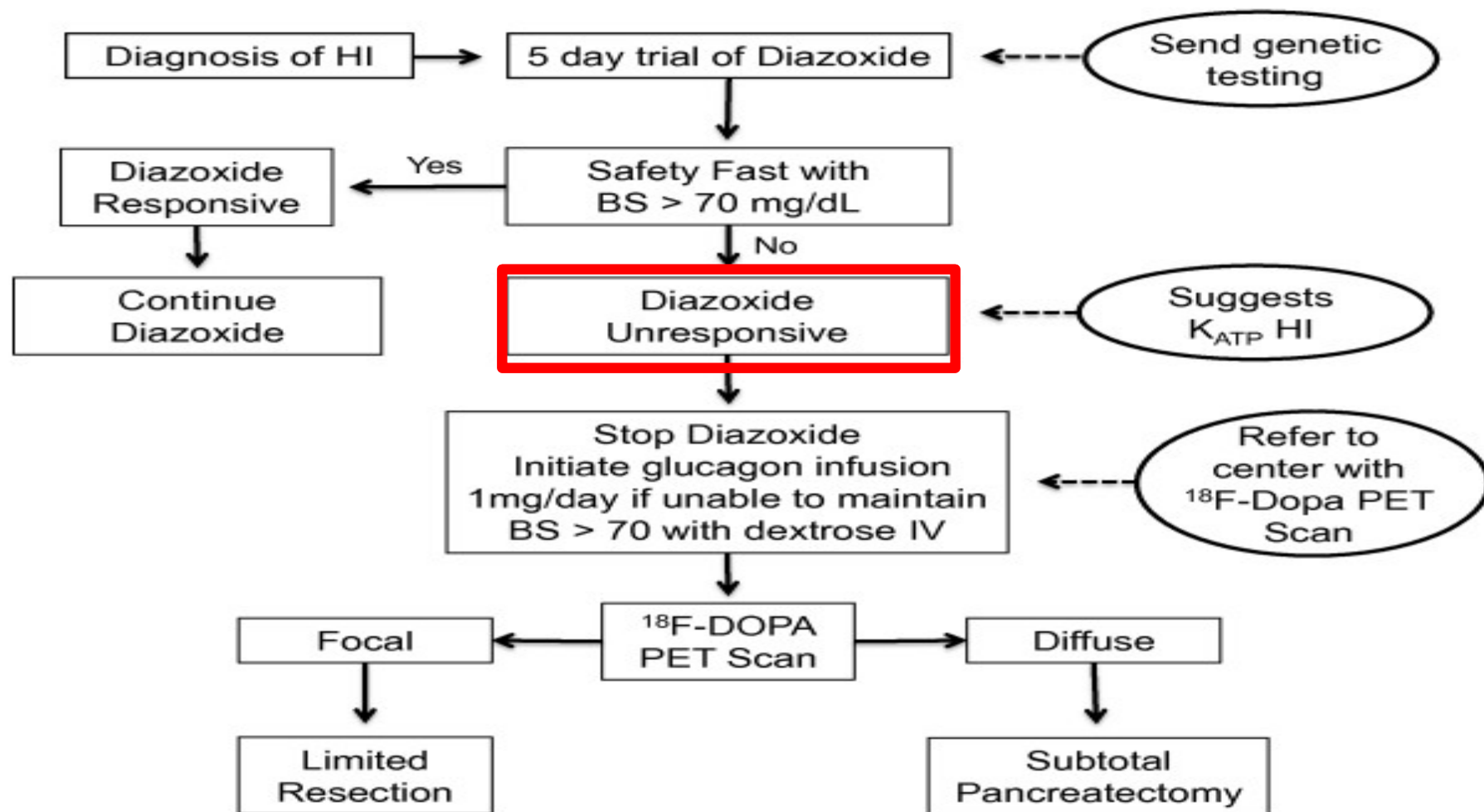
- ❖ patient is injected with a radiotracer (^{18}F -DOPA)
- ❖ the machine picks up the emitted protons in the form of gamma radiation.





A typical PET/CT machine

Dx algorithm



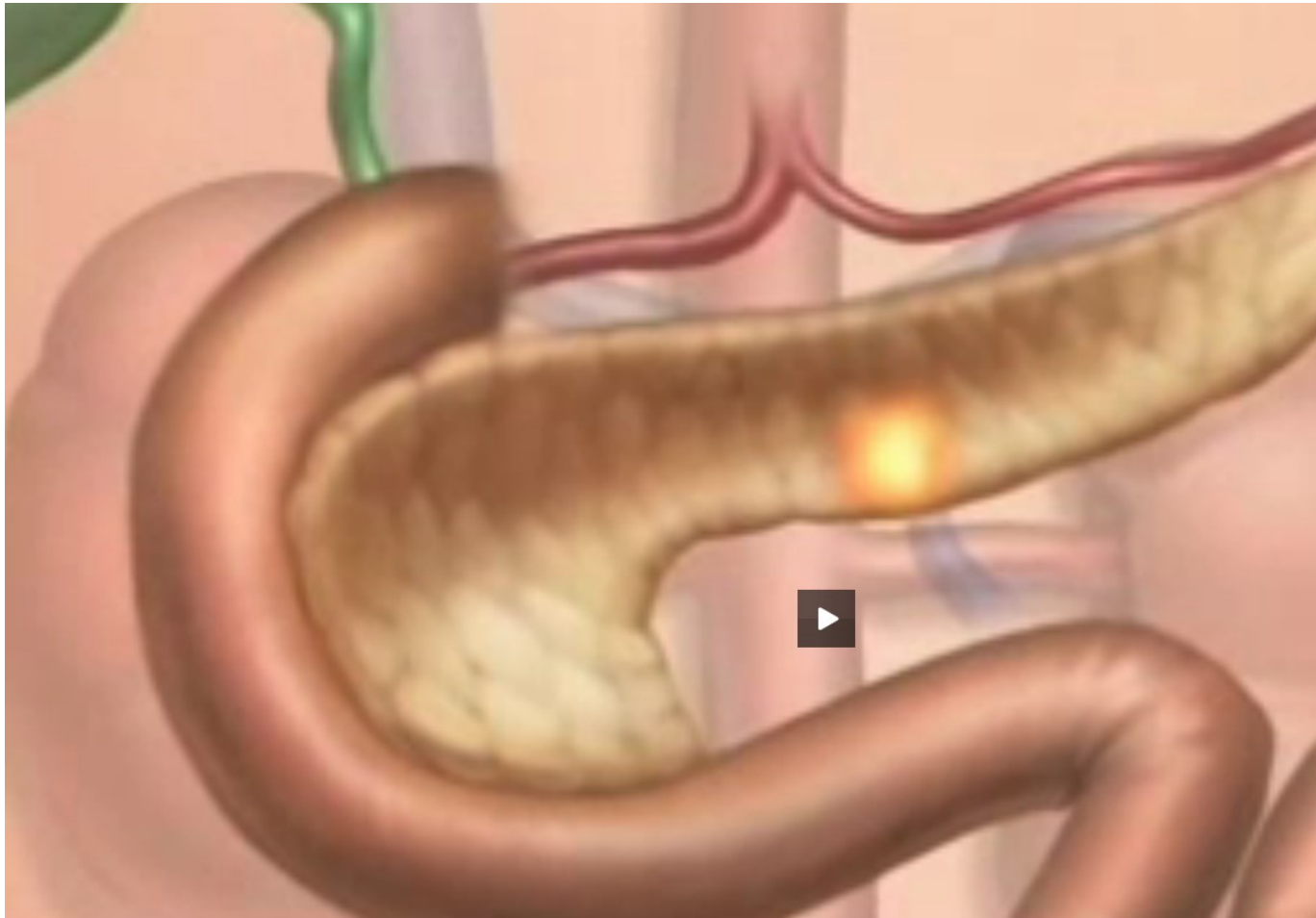
Lord and De León *International Journal of Pediatric Endocrinology* 2013 **2013**:3 doi:10.1186/1687-9856-2013-3

Who benefits from having a PET scan?

- MUST BE PLANNING SURGERY
- Children with one recessive genetic mutation in the KATP channel genes from dad
 - either ABCC8 or KCNJ11 = KATP defect
- Children with no known genetic mutation & who will have surgery (chance that we might find a focal lesionlow, but not 0)
- Children suspected of having BWS (might be able to have a limited pancreatectomy)
- **MUST NOT HAVE GENETICS CONSISTENT WITH DIFFUSE DISEASE!**

Why don't we do PET scans on everyone ?

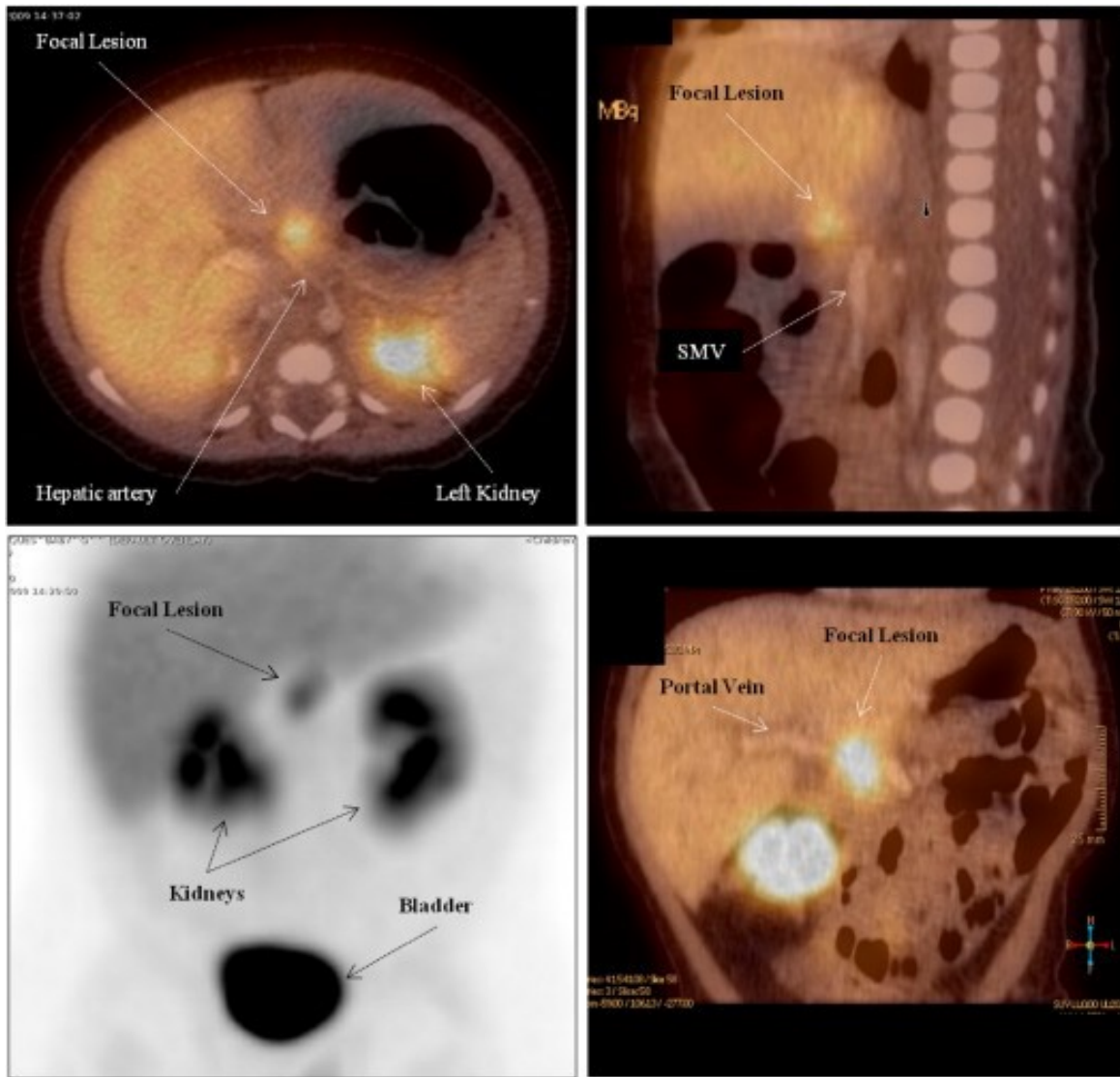
- If child is not going to have surgery, we have no way to confirm if the PET scan was accurate
 - Sensitivity of PET scan is 85%
 - small focal lesions < 1cm can be missed on PET scan and but identified at surgery.
- Children with HI/HA as these mutations in GDH are known to affect the entire pancreas
- Children with GK HI (again affects the whole pancreas)
- Children with 2 KATP channel mutations, have a dominant mutation, or a maternal mutation are all expected to be diffuse.



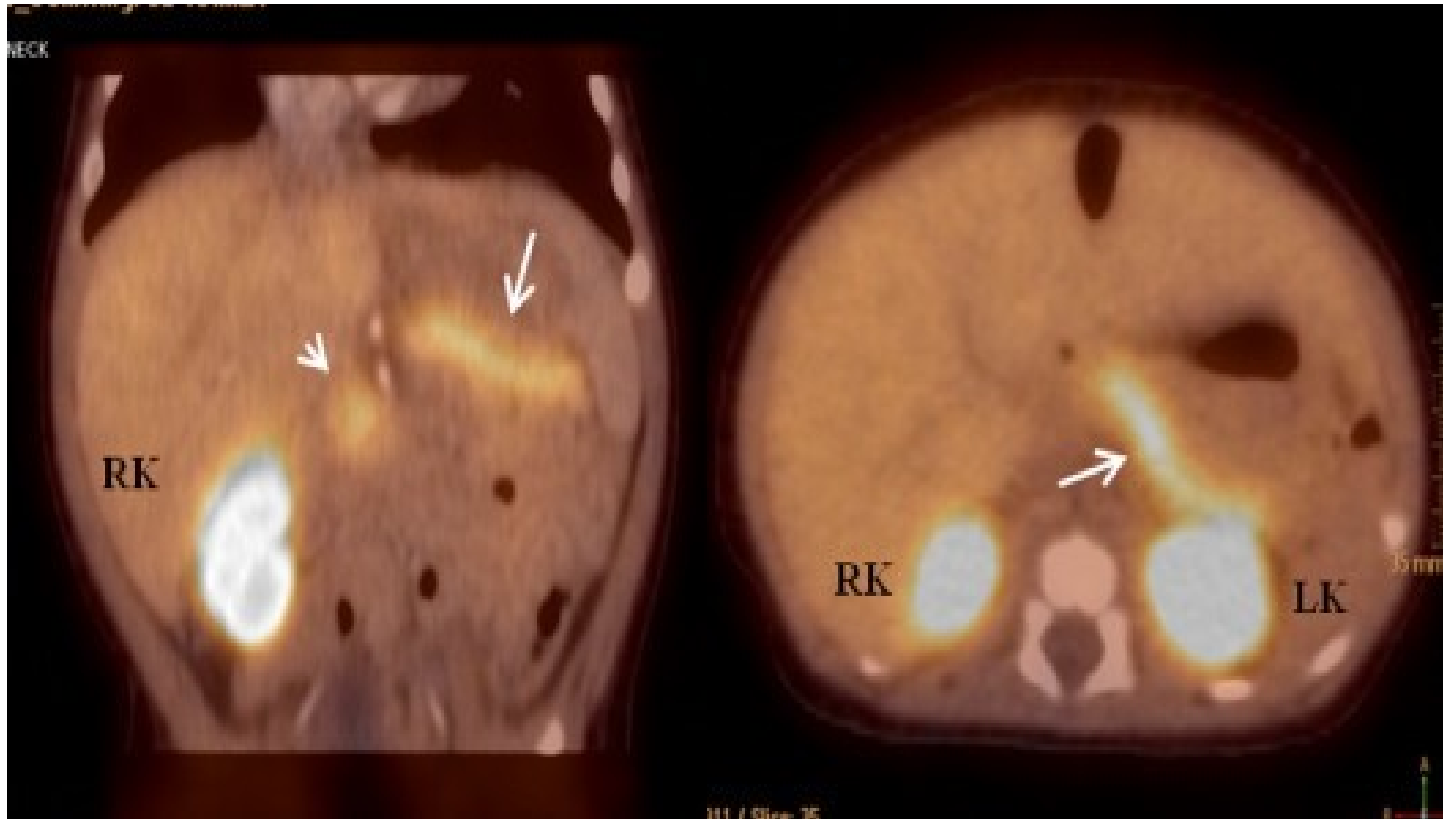
Cartoon of focal lesion

Image from Congenital HI video available at <http://hyperinsulinism.chop.edu>

Focal Pet/CT scan

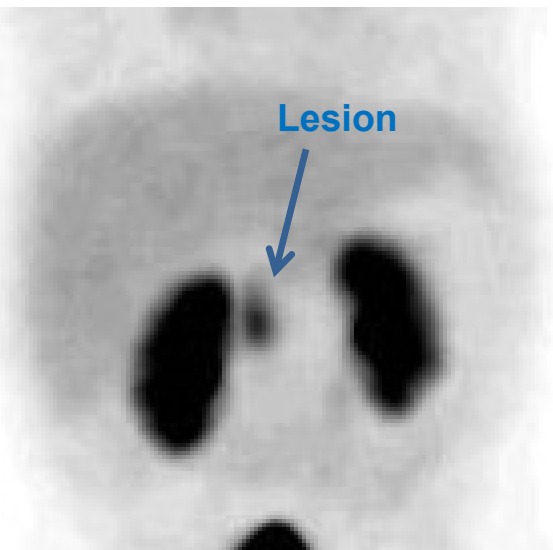
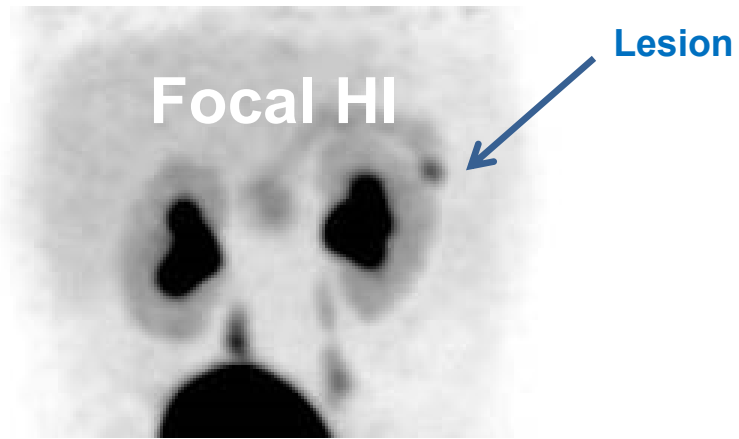


Diffuse PET/CT scan



Fused image of CT with PET

A variety of focal lesions



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The GPS for the surgeon *surgical planning*

❖ If a focal lesion is seen on PET

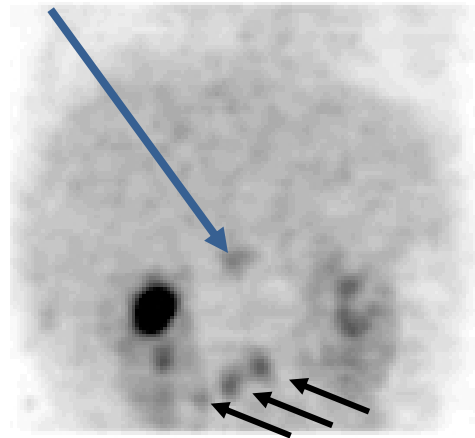
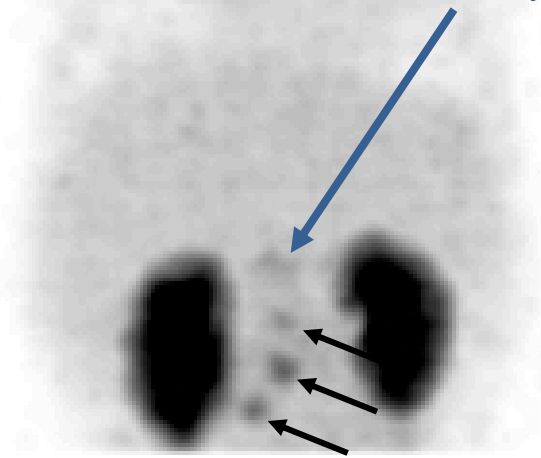
- Direct the surgeon to exact location of lesion to limit surgical/anesthesia time.
- Limit the amount of pancreas removed.
(preventing future diabetes)
- Location may be ideal for a laparoscopic procedure.
(maybe shorter recovery)

ECTOPIC

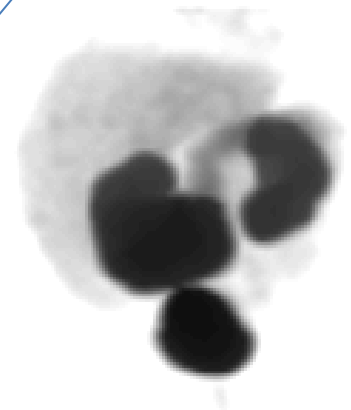
10 min post injection

60 min post injection

Residual head of pancreas



Ectopic focal lesions



Beckwith-Wiedemann syndrome

Peranteau, et al, J Ped Surg. Vol 42, Issue 1
Jan 2007

Taking the patient to PET...

24 Hours at CHOP

POSTED ON FRI, JUN 10, 2011



Image from Philly News June 10, 2010 retrievable from
<http://www.philly.com/philly/video/BC987106198001.html>

Thanks to our multidisciplinary team



Special thanks to study coordinator, Susan Becker RN, who is the “face” of our PET program.