ESR EUROSAFE IMAGING

Ask EuroSafe Imaging
Tips & Tricks

What patients should know
Paediatric Working Group

I had an X-ray but didn't know that I'm pregnant. And now?

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Real stories from the Web

- "I had an X-ray last week on my lower back (had to have injections in my back and they had to take 3 or 4 pictures). I did one of those pregnancy tests which tells you 6 days early just in case I was, I only did the test one day early, but it was negative so didn't think there was anything to worry about. Then on Sat I found out I was pregnant! Now I am worried sick…"
- "….I am going through the worst scenario right now. I had 7 exposures in one day without knowing that I was pregnant. Three were done on my pelvis and 4 on my hip. I was just 9 days pregnant at the time. I'm worried sick that the amount of exposures will harm the baby… I'M DRIVING MYSELF CRAZY"

As a matter of fact

- Despite the usual precautions to rule out pregnancy before performing a X-ray study, thousands of women who are unaware of being pregnant have X-ray examinations every year
- X-rays exposure during pregnancy always causes huge anxiety in pregnant women
- Misinformation on the related risks of malformation of the foetus or cancer during childhood can lead some women to seek voluntary termination of pregnancy
- Supplying pregnant women with accurate information is pivotal to avoiding unnecessary fear, anger, anxiety and unnecessary termination of pregnancy

Getting the thing into perspective

- **ALL OF US are exposed to natural background radiation**, originating from soil, rocks, and outer space: this background radiation is always there and it is NOT caused by pollution
- The unit of measure for radiation exposure can be given in **milliGray**
- 1 milliGray is approximately the dose that everyone receives annually from natural background radiation
- It has never been shown that this minimal amount of radiation from natural background can cause harm
- The radiation exposure from X-ray studies is usually much less than 1 milliGray with conventional radiology and a few times more for computed tomography

We know that:

- Radiation exposure during pregnancy may cause malformations in the unborn baby or cancer during childhood
- The radiation risk to the unborn baby is related to the stage of pregnancy at the time of exposure and to the quantity of radiation adsorbed by the foetus
- The risk for the unborn baby is highest during the first weeks of the 1st trimester, less during the 2nd trimester, and least in the 3rd trimester

but...

But...

- **The chance of malformation in the unborn baby or the chance of cancer during childhood caused by a radiation dose of < 50 milliGray is negligible**
- **With a dose of at least 100 milliGray,** the chance of organ malformations in the unborn baby or development of cancer during childhood is about 1%
- **Foetal doses of 100 milliGray *are never reached* even in pelvic computed tomography or with tens of conventional diagnostic X-ray studies**

More in detail: approximate foetal doses from conventional X-ray examinations

Examination	Mean dose (milliGray)	Maximum dose (milliGray)
Abdomen	1.4	4.2
Chest	<0.01	<0.01
Lumbar spine, urography	1.7	10
Pelvis	1.1	4
Skull	<0.01	<0.01
Thoracic spine	<0.01	<0.01
Barium meal	1.1	5.8
Barium enema	6.8	24

More in detail: approximate foetal doses from computed tomography (CT) studies

Examination	Mean dose (milliGray)	Maximum dose (milliGray)
Head CT	<0.005	<0.005
Chest CT	0.06	1.0
Abdomen CT	8.0	49
Pelvis CT	25	80

In conclusion

- A foetal dose of less than 100 milliGray carries a negligible risk of radiation-induced malformation and radiation induced cancer during childhood
- **None of the diagnostic X-ray studies commonly performed causes a 100 milliGray exposure to the foetus**
- **Termination of pregnancy at foetal doses of less the 100 milliGray is NOT justified**
- In case you were not aware of being pregnant and you had a X-ray study, always seek advice from the institution where the study was performed or from your practitioner

The information provided in this Tips & Tricks issue are based on the following documents:

- ICRP International Commission on Radiation Protection (2000) Pregnancy and medical radiation. ICRP 84, Ann ICRP 30(1):1-45
- ACOG American College of Obstetricians and Gynecologists. Committee on Obstetric Practice. Guidelines for diagnostic imaging during pregnancy (2004) Obstet Gynecol 104:647-651
- ACR American College of Radiology. ACR-SPR practice parameters for imaging pregnant or potentially pregnant adolescents and women with ionizing radiation