

Chest computed tomography (CT) for detecting pulmonary embolus in pregnant woman puts the fetus at risk to the adverse effects of radiation. The severity of these effects depends upon the absorbed dose and gestational age. Since the radiation from these studies is mostly transdiaphragmatic, the fetal dose is mainly due to internal scatter which depends upon the kVp, mA, slice thickness and scan pitch. To reduce the dose to the fetus, we use the high Z attenuation property of a barium sulfate contrast solution to design an internal shield. In a Rando phantom a contoured slab filled with either a 2% solution of barium sulfate or water was placed between the thorax and the abdomen. To measure the attenuation of the internal scatter, thermoluminescence detectors of thickness 0.04 and 0.23 g/cm² were placed just below the slab and 10 cm distally to simulate the position of the uterine dome in late and early pregnancy, respectively. For a typical spiral lung CT (130 kVp and 230 mA) the measured attenuation of the barium slab solution relative to water was 20% and 32% behind the slab and 10 cm from it, respectively. These results imply that a 40% solution of barium sulfate would decrease the fetal dose to a negligible level so that even follow up high quality imaging could be performed with minimal risk. Data will be presented for various combinations of kVp, mA and concentrations of barium sulfate to support this conclusion.