The predicament of cancer presenting during pregnancy

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Authors: D. O'Mahony, G. Murphy, G. Wilson, M. T. Keogan; Dublin/IE
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Learning objectives

To review the number and types of malignancies presenting during pregnancy at St. James's Hospital, a national cancer centre, since the introduction of the PACS system in June 2006.

To review the modality of imaging used to diagnose and stage cancer presenting during pregnancy, the timing of the imaging, the imaging findings, treatment and outcome on a case basis.
Background

Cancer complicating pregnancy is rare. The incidence ranges from 0.07% to 0.1% of all malignant tumours. The most common malignancies associated with pregnancy include breast, cervical, melanoma, lymphoma and leukaemia. In the USA 3,500 new cases of cancer are diagnosed annually in pregnant women at a rate of 1 per 1000 gestations. While cancer presenting in pregnancy is uncommon it can be expected to increase as women are delaying pregnancy into the later reproductive years.

Cancer complicating pregnancy raises issues with respect to the diagnosis, staging and treatment of disease. Radiological investigation is essential for the diagnosis and staging of disease, which subsequently determines treatment options. The most common radiological investigations for staging of malignancy are contrast enhanced CT and PET studies, forms of ionising radiation. These investigations are to be avoided during pregnancy due to the harmful effects of ionising radiation and the harmful effects of contrast media to the foetus. This presents a major challenge to both the clinician and the radiologist when deciding what is best for mother and the baby with respect to diagnosing and staging disease in order to instigate appropriate timely therapy.
Imaging findings OR Procedure details

St. James's Hospital Experience

Between June 2006 and December 2009 there were 15 cases of cancer complicating pregnancy diagnosed at St. James's Hospital with imaging available for review.

8 cases of breast cancer
2 cases of primary lung tumours
1 case of neuroendocrine tumour of the ovary
1 case of invasive cervical cancer
1 case of bronchial carcinoid tumour
1 case of lymphangitis carcinomatosis
1 case of Hodgkin's lymphoma

Median age of the patient at diagnosis was 36 years [16-45]
Median gestational age of the pregnancy at diagnosis was 20 weeks [7-37]

Patients were diagnosed and staged using ultrasound, chest x-ray (with abdominal lead protection) or non contrast-enhanced MRI. Patients underwent staging using CT, PET/CT or bone scintigraphy following delivery of the baby.

St. James's Hospital Experience - 5 representative cases of cancer complicating pregnancy

Case 1 - Neuroendocrine tumour of the right ovary presenting at 20 weeks gestation in a 32 year old.

The patient presented with lower abdominal pain. Ultrasound of the abdomen revealed a mixed cystic/solid avascular mass in the right adnexa. Non-contrast MRI pelvis confirmed a 17x13 cm mixed solid/cystic right adnexal mass. The patient proceeded to laparotomy and resection of the adnexal mass. Two months later she underwent Cesarean section delivery, hysterectomy and bilateral oophorectomy. The first staging CT scan, was
performed at 3 months following the initial diagnosis, and showed no evidence of metastatic disease.

Figure 1: Right ovarian neuroendocrine tumour presenting as lower abdominal pain in a 32 year old at 20 weeks gestation.

Case 2 - Cervical carcinoma presenting at 14 weeks gestation in a 36 year old.

The patient was referred to our institution for a non-contrast MRI pelvis which diagnosed a stage 2B cervical tumour. She was initially treated with chemotherapy and followed up with interval MRI during the pregnancy. She delivered a healthy term baby and the first staging CT scan, following chemoradiation therapy, was performed 6 months after the initial diagnosis and showed no evidence of metastatic disease.

Figure 2 and 3: Cervical carcinoma presenting in a 36 year old at 14 weeks gestation

Case 3 - Hodgkin's Lymphoma presenting at 20 weeks gestation in a 16 year old.

The patient was referred for ultrasound neck to evaluate a right supraclavicular fossa swelling. Ultrasound guided biopsy diagnosed Hodgkin's lymphoma. A chest x-ray (with abdominal lead protection) and ultrasound abdomen were performed to stage the disease. Chest x-ray revealed bilateral hilar lymphadenopathy. The patient was treated with chemotherapy and 6 days post delivery of a term baby she proceeded to staging PET/CT which confirmed a good response to treatment with resolution of the mediastinal lymphadenopathy.

Figure 4, 5 and 6: Hodgkin's lymphoma presenting as a right supraclavicular fossa swelling in a 16 year old at 20 weeks gestation.

Case 4 - Bronchial Carcinoid tumour at 37 weeks gestation in a 31 year old.

The patient presented with dyspnoea and pleuritic chest pain. Serial chest x-rays revealed persistent right middle and lower lobe collapse. A term baby was delivered. The patient proceeded to a staging CT scan post partum which diagnosed a calcified tumour mass obstructing the bronchus intermedius with no evidence of metastases. The primary tumour was resected. The patient had a good recovery.
Figure 7 and 8: Bronchial Carcinoid presenting as persistent right middle and lower collapse in a 31 year old at 37 weeks gestation.

**Case 5 - Lymphangitis Carcinomatosis at 35 weeks gestation in a 31 year old.**

The patient was referred with progressive unremitting dyspnoea. Chest x-ray at presentation showed a diffuse bilateral reticular infiltrate. Differential diagnosis included miliary tuberculosis, lymphangitis. Following delivery of a term baby a CT thorax was performed which confirmed a diffuse bilateral pulmonary nodular infiltrate and a diagnosis of lymphangitis carcinomatosis was made. Completion CT abdomen and pelvis did not reveal a primary tumour. The patient died 2 months after the diagnosis.

Figure 9 and 10: Lymphangitis Carcinomatosis of unknown origin presenting as progressive dyspnoea in a 31 year old at 37 weeks gestation.
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Conclusion

Radiological investigation is essential for diagnosis and staging of cancer which influences treatment choice and patient outcome. The timing and choice of imaging technique pose potential risk to the foetus but this must be weighed against the risks to both the mother and foetus of inadequate investigation, misdiagnosis or delayed treatment. While cancer presenting in pregnancy is rare, it can be expected to increase as women are delaying pregnancy into their later reproductive years.
Personal Information

Dr. Deirdre O'Mahony,
Specialist Registrar,
Department of Radiology,
St. James's Hospital,
Dublin,
Ireland

deirdre.m.omahony@gmail.com
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