



Head of College Scholars List Scheme

Summer Studentship

Report Form

This report should be completed by the student with his/her project supervisor. It should summarise the work undertaken during the project and, once completed, should be sent by email to: jill.morrison@glasgow.ac.uk within four weeks of the end of the studentship.

1. Student

Surname: Dolan

Forename: Daniel

E-mail address: 2117391d@student.gla.ac.uk

2. Supervisor

Surname: Park

Forename: James

E-mail address: James.Park@glasgow.ac.uk

3. Research Project Report

3.1 Project Title (maximum 20 words): The relationship between vascular calcification and response to preoperative radiotherapy in patients with locally advanced rectal cancer.

3.2 Project Lay Summary (copied from application): Radiotherapy is routinely used prior to surgery in patients with locally advanced rectal cancer. Although some patients may show little or no response to such treatment, at present there is no way to predict response. Identification of such markers may prevent unnecessary treatment, exposure to treatment side effects, and subsequent. One possible predictive marker could be vascular calcification. Low tissue oxygen levels are associated with poor response to radiotherapy, and calcified vessels on pre-operative staging scans may be representative

of low tissue oxygen levels. The present study therefor aims to examine the relationship between these two factors.

3.3 Start Date: 25/7/16

Finish Date: 9/9/16

3.4 Original project aims and objectives (100 words max): To assess the relationship between the severity of aortoiliac vascular calcification on pre-operative staging CT scans, and response to pre-operative radiotherapy in patients who subsequently undergo resection of colorectal cancer. The study hypothesis is that an increased burden of aortoiliac calcification will be associated with a poor response or lack of response to radiotherapy in patients with colorectal cancer. Taking into consideration other patient and tumour related characteristics, we aim to examine whether aortoiliac vascular calcification may be an independent predictor of radiotherapy response. This will inform the design of future, prospective studies of radiotherapy in patients with rectal cancer.

3.5 Methodology: Summarise and include reference to training received in research methods etc. (250 words max): Patients eligible for the study were identified from a prospectively collected database of patients with rectal cancer who underwent elective, potentially curative surgical resection in a single colorectal surgical unit at the Glasgow Royal Infirmary. I was then instructed by a radiologist registrar about how to properly interpret CT scans, and together we devised a scoring system for assessing the degree of vessel calcification. This was done by eye from the scans, and a number between 0 and 4 was used to describe the percentage of the vessel circumference that was calcified. A degree of anatomical learning was included in the training: namely how to identify the aorta, aortic bifurcation and common iliac arteries on CT scan. The radiologist registrar then co-scored the first 20 patients, and this allowed us to calculate the inter-observer bias. I then rescored the first 20 patients after 4 weeks had passed, in order to calculate my intra-observer bias. I was then taught how to use SPSS software to carry out the

calculations that would be required to look for a correlation between vessel calcification and response to radiotherapy.

3.6 Results: Summarise key findings (300 words max). Please include any relevant tables or images as an appendix to this report: There was no significant relationship identified between levels of vascular calcification in patients and their response to neoadjuvant therapy.

3.7 Discussion (500 words max): Unfortunately, it seems as though our hypothesis about vascular calcification being a predictive factor for neoadjuvant therapy response was not proven by the study. One factor that may have contributed to this was the small sample size- only 80 patients were involved in the study. This was however the total number of patients who had passed through the Glasgow Royal Infirmary and had undergone neoadjuvant therapy followed by potentially curative surgery for rectal cancer in the period 2008-2016. In order to increase patient numbers we would have had to include other surgical centres in Scotland and perhaps further afield. This data would likely have proved difficult to procure, and there may have been inconsistencies with how data was recorded with regard to the Glasgow Royal data. Expanding beyond one surgical centre would also introduce a greater deal of variation in surgical practice and protocol in terms of radiotherapy treatment. The low number of participants made it difficult to obtain results with any significant power. Perhaps this study could provide an outline to researchers who wish to explore the relationship between vascular calcification and neoadjuvant therapy response in the future. A larger, multi-centre study may shed light on a correlation between the two factors.

4. Reflection by the student on the experience and value of the studentship (300 words max):
The summer project was organised with the colorectal surgery department at the GRI- where I had been placed earlier in the year for an SSC module. Going back again in the summer afforded me the chance to immerse myself in the world of colorectal cancer and general surgery again;

which I thoroughly enjoyed. Learning how to properly interpret CT scans, taught by a radiology registrar, was incredibly useful. Having started back in third year of university it is noticeable that I have had a bit of head-start in this respect, with regard to my peers. Exposure to research, and the techniques involved was a novel experience for me, and one which I found to be enriching, and in the future I'm sure this early exposure will pay dividends. Learning about calculating inter-observer and intra-observer was useful. I had read these terms in research papers before, but had never really understood what they meant, now I do. And after having to calculate my own, I understand why calculations like this are so significant in examining the value of a study. Using the SPSS statistics software was daunting at first, but after some instruction I got the hang of it, and I feel being able to use SPSS is a skill that will definitely come in handy in the future.

5. Dissemination: (note any presentations/publications submitted/planned from the work):

6. Signatures: Supervisor Date Student Date