Radiologic Pathologic Correlation in Renal Cell Carcinoma

Date: 2024/02/22

Client: Dr. Meghan Lubner
Advisor: Dr. Tracy Puccinelli

Team:
Ellie Steger (Team Leader)

Erin Schlegel (Communicator)

Emily Wheat (BWIG)

Olivia Jaekle (BPAG)

Aleks Skutnik (BSAC)

Problem statement

The goal of this project is to develop a blade for a tumor resection coring device. The blade should be able to effectively resect a cross-section from an ex-vivo kidney tumor without causing damage to the overall tissue sample. Currently, the resection device used is too blunt and thick to effectively extract tissue without causing surrounding areas to be damaged and un-imageable on CT. By creating a new blade design, the pathologist can preserve the extracted tumor during the coring process. In maintaining the integrity of the tumor, the pathologist will be able to accurately correlate CT image markings and findings with their location in the patient sample.

Brief status update

The team has decided to attempt to publish in the journal Medical Devices: Evidence and Research. The team also updated the solidworks of our coring device based on the size of the new blade and feedback provided from Sylvana from UW Health. We then 3d printed the device with alterations made to the curing process to counteract any warping previously observed.*This print will not be complete until Friday morning, we can send a separate update on the outcome of it. FInally, the team has written drafts of testing protocols and done adequate research on silicone molds.

Difficulties / advice requests

The team is looking for approval on our journal choice.

Current design

Our current design is our final design from the fall semester, which can be found here: https://bmedesign.engr.wisc.edu/projects/f23/coring_device.

Materials and expenses

Item	Description	Manufacturer	Quantity	Cost
Trephine Blade	AM0570S 100- 10mm d	Miro surgical	1	$92.71

Major team goals for the next week

1. One goal is to verify that the adjustments to the coring tubes's printing setup are effective.
2. Another goal we have is to verify that we will be submitting to Medical Devices: Evidence and Research and format our prelim report accordingly.
3. Lastly, our team will complete the preliminary report with user manual, service manual and safety hazard outlines attached.

Next week's individual goals

- Aleks Skutnik
  - Complete preliminary report
  - Collaborate on developing user manuals for the design
  - Work on outreach presentation
- Emily Wheat
  - Complete preliminary report
  - Collaborate on developing manuals
  - Work on outreach presentation
  - Update website
- Erin Schlegel
  - Rework any issues with the new coring device
  - Analyze how the new coring device fits with the purchased blade
  - Complete the preliminary report
- Olivia Jaekle
  - Work on safety manual and service instructions
  - Work on outreach presentation
  - Draft up results for preliminary report
  - Gather all appendices and extra information for journal draft

- Ellie Steger
    - Complete the conclusions section of the preliminary report.
    - Collaborate on editing the report and the manual outlines
    - Verify that the coring device is ready for compatibility testing
    - Pick up the 3d printed coring tube from the makerspace

Timeline

Task	Feb				March					April				May	
	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
Project R&D															
Coring Device Prototyping		X	X	X											
Blade Prototyping		X													
Packaging Prototyping															
Compatability Testing															
Final Device Testing															
Testing Analysis															
Deliverables															
Prelim Report															
User Manual															
Maintenance Instructions															
Service Instructions															
Safety Precautions															
Final Poster															
Final Report															
Meetings															
Client		X		X											
Advisor	X	X	X	X											
Website															
Update	X	X	X	X											

Filled boxes = projected timeline
X = task was worked on or completed

Previous week's goals and accomplishments

- Week 4 Goals:
    a. Finalize coring tube design and meet with Sylvana
        - Met with Sylvana and established new printing criteria

    b. Finalize testing protocol documents
    c. Begin compatibility testing between the blade and the coring device
        - The new coring device will be ready for testing for next week
- Week 3 Goals:
    a. Present our preliminary presentation
        - The team presented our presentation to our advisor
    b. Create testing protocols to compare the purchased circular trephine blade to the blade we fabricated last semester
        - After consultation with our advisor the team has shifted our plans to move forward with the trephine blade with comparison testing
    c. Create a final solidworks file for the coring device
- Week 2 Goals:
    1. Meet with advisor to discuss preliminary presentation
    2. Practice and present preliminary presentation
        a. The team will present on 2/9
    3. Set up payment plan and order premade blades
        a. The team ordered the blades
- Week 1 Goals:
    1. Set up the team notebook, meet with client,
        a. The team was able to successfully create a Lab Archives notebook and meet with our client.