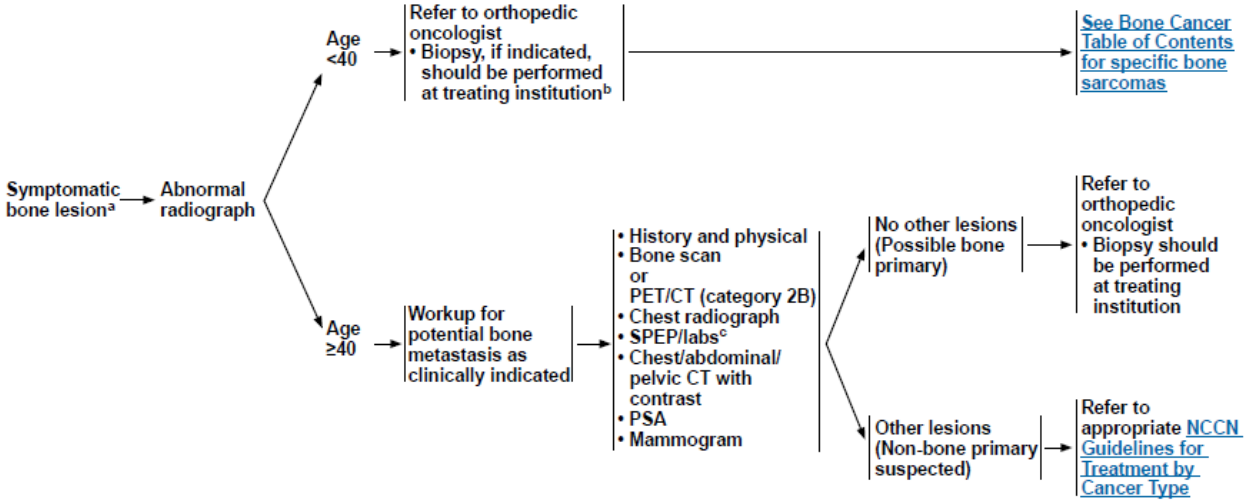
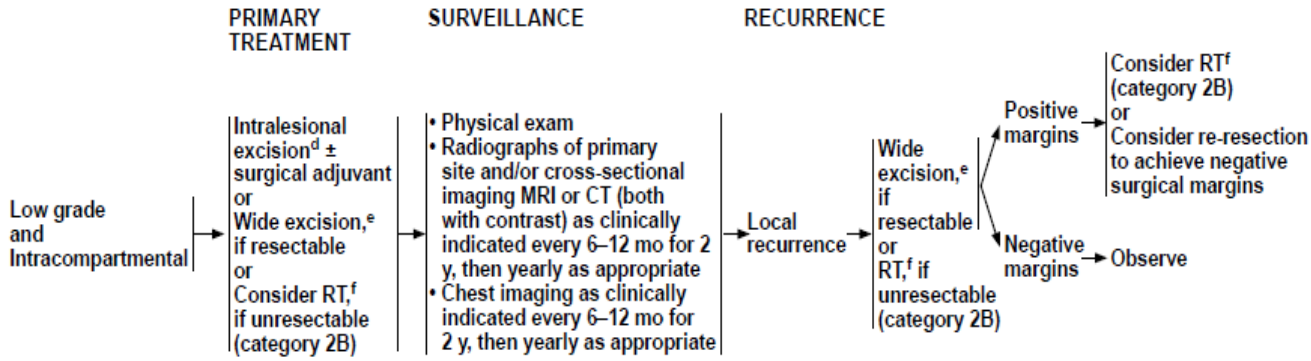
COG 366 Project Part 6

Our choice for the project was bone cancer, and since there are many different types of bone cancers we had to limit our scope to make it feasible for our project. The specific bone cancer type we will focus on is Chondrosarcoma. Chondrosarcoma forms in cartilage cells and is the second most common form of bone cancer, it rarely occurs in people under the age of 20, and the chances of developing increase with age. From the National Comprehensive Cancer Network (NCCN) we have derived the route in which Chondrosarcoma is diagnosed and treated.

This is a scenario under assumption that it leads to diagnosis and treatment. It starts with a symptomatic bone lesion which leads to an abnormal radiograph. Then the next sequence of steps depends on the person's age, if the patient is less than forty years old they will be referred to an orthopedic oncologist which will perform the biopsy. We are assuming it is low grade and intracompartmental which means the tumor has basically remained in the bone and the cells look normal and are less likely to grow and spread fast. Assuming the tumor is resectable, which means it can be removed with surgery, the surgery will be performed to remove the tumor. After the removal there will be physical exams, radiographs of the site to make sure there is no local recurrence. If there is a sight of local recurrence then the tumor will be removed again with surgery and assuming there are negative margins indicates the tumor was removed successfully, then the patient is observed again similar to the first removal.

There is a slight difference in the treatment plan if the patient age is greater than forty. That patient would go through numerous amounts of testing, for example: physical, bone scan, chest radiograph, Mammogram and more. If there are no other lesions, it is a possible case of bone cancer so the patient will be referred to an orthopedic oncologist which then a biopsy will be performed and then follows the same procedure as a patient would if they were less than forty.


Symptomatic bone lesion[a]
Abnormal radiograph
Age <40
Refer to orthopedic oncologist
• Biopsy, if indicated, should be performed at treating institution[b]
See Bone Cancer Table of Contents for specific bone sarcomas
Age ≥40
Workup for potential bone metastasis as clinically indicated
• History and physical
• Bone scan or PET/CT (category 2B)
• Chest radiograph
• SPEP/labs[c]
• Chest/abdominal/pelvic CT with contrast
• PSA
• Mammogram
No other lesions (Possible bone primary)
Refer to orthopedic oncologist
• Biopsy should be performed at treating institution
Other lesions (Non-bone primary suspected)
Refer to appropriate NCCN Guidelines for Treatment by Cancer Type


PRIMARY TREATMENT
SURVEILLANCE
RECURRENCE
Low grade and Intracompartmental
Intralesional excision[d] ± surgical adjuvant or Wide excision,[e] if resectable or Consider RT,[f] if unresectable (category 2B)
• Physical exam
• Radiographs of primary site and/or cross-sectional imaging MRI or CT (both with contrast) as clinically indicated every 6–12 mo for 2 y, then yearly as appropriate
• Chest imaging as clinically indicated every 6–12 mo for 2 y, then yearly as appropriate
Local recurrence
Wide excision,[e] if resectable or RT,[f] if unresectable (category 2B)
Positive margins
Consider RT[f] (category 2B) or Consider re-resection to achieve negative surgical margins
Negative margins
Observe

Understanding the Model:

Much of the modeling of our world has been done for us using the guidelines provided by the NCCN. The basics of which are, facts that would cause decisions to be made are written initially in the knowledge base, and rules are then called using those facts as the knowledge for the rules to make decisions from. However, this does not include the techniques for revising beliefs based on what those rules return.

Following previous readings allow us to have a better understanding of how this belief revision works. To begin, we have inclusion which essentially just means that an action implies the consequences of that action. This leads to monotony, where an action implying an action means that the consequences of the first action also imply the consequences of the second action. And finally iteration means that the consequences of an action imply the consequences of the consequences of the action. This final one is the most important of our model as many of the “consequences” provided in the model lead to entirely new rules.

The main goal when performing belief revision is to add new facts to the knowledge base while also making sure that the beliefs in the knowledge base are consistent with one another. For instance, if we say that our patient is 20 years old, we can’t later add the fact that the patient is 40 years old. The rules have to be built around this, making sure that they return non-contradicting information while still providing new information to add to the knowledge base.

In addition, we need to ensure that the information that we are deriving from our rules is formatted in such a way that it can be easily added to the knowledge base. A more direct approach would be to literally output a fact that you could write in the knowledge base. However, one could also make lists for each category of information, such as symptoms, that could be parsed with other rules in order to make decisions.

Works Cited

Hansson, S. O. (2017, October 23). *Logic of Belief Revision*. Stanford Encyclopedia of Philosophy. Retrieved November 10, 2021, from https://plato.stanford.edu/entries/logic-belief-revision/#Revi.

“National Comprehensive Cancer Network - Home.” *NCCN*, https://www.nccn.org/.

“Treatment by Cancer Type.” *NCCN*, https://www.nccn.org/guidelines/category_1.

“What Is Bone Cancer?.” *American Cancer Society.* https://www.cancer.org/cancer/bone-cancer/about/what-is-bone-cancer.html