Wednesday, April 12, 2017

Summary of Last Meeting
Imaging based detection and MRI guided in-bore biopsy and diagnosis
Dr. James Cooper, Imaging Healthcare Specialists and Prostate Cancer Treatment Center

Dr. Cooper started with a review of the state of diagnosing prostate cancer, including its epidemiology (frequency of occurrence and comparison with other cancers), noting particularly that most men diagnosed with prostate cancer do not die from it. Survival rates have increased over the past 25 years: the 5-year survival rate has risen from 69%.
to almost 99%. The 10-year survival rate is now 98%, and the 15-year survival rate is now 95%.

However, current widely-used methods of screening for prostate cancer are leading to "over diagnosis" (excessive attention given to tumors very unlikely to ever become life-threatening) and over-treatment. The current gold standard of diagnosis is a TRUS (trans-rectal ultrasound) biopsy, typically involving a dozen painful insertions of sampling needles, which sample only about 1% of the prostate overall, and entirely miss sampling a large portion of the prostate (due to the use of relatively short needles, and avoiding the area near the urethra due to fear of damaging it). As a result, 30-35% of the time, the patient is falsely thought to be free of tumors, and 35-45% of the time, those tumors that are found are thought to be less dangerous than they really are (that is, they are assigned a falsely low Gleason score). Typically, whole gland therapy (radical prostatectomy or irradiation of the entire prostate) is given, which leads to morbidity (that is, unpleasant side effects such as incontinence or impaired sexual function). And although many patients are put on "Active Surveillance," 25% of them harbor undetected prostate tumors that should be actively treated.

Dr. Cooper's goal is to find "Clinically Significant" prostate cancer. This is defined as comprising a tumor that poses a significant risk to health. A so-called "index tumor," has a tumor volume of more than 0.5 ml (about 1/10th of a teaspoon) and/or a Gleason pattern of 4 or 5 (i.e., very abnormal-looking cells found in the biopsy). Any tumors outside the "capsule" of the prostate (i.e., in the seminal vesicles or lymph nodes, bones or other tissues) also signify that the cancer is clinically significant. By correctly identifying if the cancer is clinically significant, then such cancers would be treated, but clinically insignificant ones would not be treated, thus avoiding morbidity (side effects) and expense.

The failure in the current reliance on TRUS biopsies is not that we are identifying too few cancers, but that we are identifying "too many." Many tumors are being unnecessarily treated.

Predictors of prognosis include the clinical stage at the time of diagnosis, from T1 to T4. However, these stages are outdated by many decades. T1 refers to tumors detected only in tissue removed during a TURP procedure ("reaming out" of the urethra to improve urine flow) or other prostate surgery. T2 means confined to the prostate, but detectable by palpation through the rectum (How primitive is that??). T3 means spread beyond the prostate "capsule." And T4 means it has invaded other nearby structures.

The Gleason score, a classification of prostate cancer aggressiveness on the basis of morphological characteristics, has provided the best predictor so far of patient outcome, despite many efforts at analyzing molecular and genetic expression. Visual examination of biopsy specimens -- for how abnormal the cells appear, using a pictorial reference chart to assign pattern number 1 (normal) through 5 (extremely abnormal), and then adding the pattern numbers for both the "dominant" (most often seen) and the secondary pattern, gives the "Gleason Score."

In 2005, the scoring was modified to cease reporting any pattern 1 or 2, and to change the sum to be the addition of the primary pattern plus the highest number pattern present. Thus, if 70% of the biopsy sample corresponded to pattern 3, 20% to pattern 4, and 10% to pattern 5, under the old system the Score would be 3+4=7, but now the score would be reported as 3+5=8. If only one pattern is present, the Score would be twice the pattern number; i.e., 6, 8, or 10. Also note that a 4+3 Score would be considered more serious than a 3+4 score, though in both cases the sum = 7.

There are no documented cases of a Gleason Score = 6 "cancer" (and Dr. Cooper along with many others believes that this should not even be classified as cancer) turning into metastatic disease.

The prostate gland is shaped like an upside down pyramid, starting in young adulthood at about the size of a walnut, and gradually enlarging. It has two main zones: The peripheral zone on the outside, comprising 70-80% of the tissue, with most of the rest considered the central zone, with some transition zone.
The base is near the bladder, and the apex is the point at the bottom. Toward the back on both lower sides is the neurovascular bundle; damage to which causes sexual dysfunction and incontinence.

Most tumors occur in the peripheral zone (consistent with its comprising most of the prostate), but more of the remaining tumors are found in the transition zone than in the central zone. Only the peripheral zone is reached in most TRUS biopsies.

Digital rectal exams identify the presence of a tumor in only 14-28% of men with prostate cancer. The PSA test is indicative, but very non-specific (with interference from other causes), and TRUS biopsies have huge problems with accurately detecting prostate tumors, discussed in the talk.

In contrast, MRI can provide an accurate test to detect, localize (and 85% of the time, there is more than one tumor), stage (determine if the disease is confined to the prostate or not), and guide the biopsy of the disease. A study published in 2011 showed 98-100% accuracy in detecting tumors using mpMRI, and sensitivity was highest with the most serious tumors (as is appropriate), as confirmed by subsequent removal and biopsy of the prostate.

Multiparametric-MRI (mpMRI) consists of a number of computer-aided detection processes: T2-weighted images, useful for finding transition zone tumors; DWI (diffusion-weighted image) & ADC (apparent diffusion coefficient) for peripheral zone tumors; Axial T1 (for overall anatomy and to see the neurovascular bundle); and DCE (dynamic contrast enhancement).

In an MRI, a magnetic field 15-30,000 times as strong as the earth’s magnetic field is used to cause the protons to line up in one direction. Then a radiofrequency pulse (similar to FM radio waves) is used to "knock" some protons out of alignment. As they return to alignment, some energy is released and detected. The T1 and T2 parameters are based on this detected energy. If you like details, know that the T1 energy is the basic "return 90 degrees back into alignment," and the T2 energy is the slight wobbling, or “precessing,” of the spinning proton as it recovers from the pulse. It's the opposite of a spinning top falling over. If it fell straight down, that would be pure T1. But it wobbles and gradually falls closer and closer to the ground. The wobbling is T2, but the overall falling is T1. Got it? It turns out that one signal is better for some purposes (e.g., T2 to see tumors in the transition zone), and the other is better for other visualization (i.e., overall anatomy, including the neurovascular bundle).

The DWI & ADC show and measure the rate of diffusion of water within the tissue. The tissue in peripheral zone tumors is more dense than healthy prostate tissue, so the movement of water molecules is restricted enough to be detected (DWI) and even quantified (ADC). If the diffusion coefficient is below 900 mm2/sec, it is strong evidence of a tumor, and the value correlates very well with the Gleason Score! Dynamic contrast enhancement (DCE) refers to images obtained as a tracer chemical injected into the patient is rapidly taken up preferentially by tumor cells, and then also quickly released back into the bloodstream. The tumor is highlighted in a bright red color, in the images generated by the software.

Regarding the hardware, Dr. Cooper explained that the differences between 1.5T and 3T (strength of the magnetic field) images, and studies with or without the endorectal coil (somewhat better images, but uncomfortable to the patient and more expensive), all are washed out by the issue of how well the machine is "tuned."

A number of Prostate Cancer cases detected by mpMRI were shown, with their various images. The procedure for MRI-guided biopsy was described, including how it can be used to precisely guide the needle into the suspicious areas identified in the diagnostic mpMRI. Patients (including this writer) report that it is practically non-painful, in great contrast to reports of traditional TRUS biopsy pain. (Trivia note: An 18-gauge needle is used, and gauge means "how many needle barrels fit side-by-side in an inch). Tumors of Gleason Score 9-10 were easily and straightforwardly found in MRI-guided biopsies, where
no tumor had been found in 2-5 prior TRUS biopsies, in four examples shown. A published study in Urology in 2010 showed that in 71 consecutive patients with PSA higher than 4 ng/ml, and at least two prior negative TRUS biopsies, that an mpMRI diagnosis and MRI-guided biopsy found cancer in 60% of these men. More importantly, 93% of the tumors were "clinically significant." Also, more than half of the tumors were in the apex or anterior side of the prostate, where TRUS biopsies don't reach.

Here's the contrast: TRUS biopsies miss 30-35% of prostate cancers. mpMRI misses only 3% of Gleason Score 4+3 tumors, and only 10% of 3+4 tumors. TRUS biopsies under-grade the Gleason Score 35-45% of the time. mpMRI with MRI-guided biopsy under-grades only 5% of the tumors (based on subsequent biopsy after prostate removal).

A new technique is promising: The UroNav system uses an mpMRI diagnostic image superimposed on a trans-rectal ultrasound image, to localize the suspected tumors for biopsy. The ultrasound image can show where the prostate is, and can give real-time images of where the biopsy needle is. The superimposed image shows where the tumor is. This may give even more accuracy than the current MRI-guided biopsy procedure, which requires sliding the patient in and out of the machine, to first take an image, then operate the needle insertion equipment, then put the patient back into the machine for the next view of the process. Dr. Cooper likes the new system, and would like to use it in his practice. A study published in 2015 showed that the UroNav system gave 30% more detection/diagnosis of high-risk cancers, and desirably less detection of low-risk cancers, than standard biopsies. Still, the tumor detection yield to date is best with MRI-guided biopsy.

Cash costs for mpMRI at Imaging Healthcare Specialists are $400 without contrast (if the patient is allergic to the contrast agent), or $575 with contrast agent injection. For an MRI-guided biopsy, the cash cost is $1600, but may be covered by Medicare at 100%. (Cost questions? Call Tami Colbert at 858-658-6416.)

Questions: What if you can't have an MRI? Reasons would be an old-type pacemaker, or a surgical clip in the brain, but most clips in other parts of the body would be OK. Axumin PET/CT (very recently FDA approved, and used a dozen times so far by Dr. Cooper) and PSMA scan technologies were explained as possible alternatives.

The expense of medicine going up is partly due to doctors purchasing expensive imaging equipment, then "overusing" it to increase their billings. The Deficit Reduction Act tried to counter this by reducing payouts for scans.

MRI after radiation? The radiation is terribly damaging, so the images are not as distinct as otherwise. And usually in those cases, a whole-body scan is appropriate.

PIRAD is an acronym, "prostate imaging reporting and data" system, developed from BIRAD reporting of breast cancer, to standardize reports. The system can be learned about online, or from additional slides from Dr. Cooper that are included with the video that will be available for purchase online or at our next meeting. The BIRAD system is used at Imaging Healthcare Specialists, and at several other organizations in our area.

The extra slides also cover "problems" with Gleason Scores, and the new 2016 WHO Gleason grading system, which has Grade Groups from 1 to 5, corresponding to Gleason Scores "6 or less," 3+4, 4+3, 8 and "9-10."

The role of MRI in detection, localization and staging is summarized in the extra slides. An intriguing slide listed four options for treating prostate cancer: Active Surveillance (for Gleason Score 6 when PSA <10, low volume on biopsy, ditto or undetectable by mpMRI, and localized to the prostate), radical prostatectomy, external beam or brachytherapy, and MRI-guided cryotherapy. That last warrants extra explanation. And what about other local therapies that might be guided by MRI or UroNav, such as NanoKnife?

The American Urologic Association guideline statements (five in all) were summarized. The updated statements from 2013 were also summarized.

Final slides: TRUS: Who gets biopsied? PSA explained, with both positive and negative issues. PSA velocity and density explained. Again, all the extra slides are included with the video that can be purchased for $10.
FUTURE MEETINGS

- April 15—Study Results of Active Surveillance, Dr. Franklin D. Gaylis, MD FACS, Genesis Healthcare [https://goo.gl/wqATBo]
- May 20—to be determined

ON THE LIGHTER SIDE

Joke

A man elects to have a prostatectomy (removal of the prostate) and asks the surgeon to try to spare the nerves that produce an erection. Well, he goes into surgery and wakes up in the recovery room and sees his doctor.

Patient: So, how did it go?
Doctor: I’ve got good news and bad news. Patient: Give me the good news first.
Doctor: We were able to save the nerves.
Patient: That’s great news! What’s the bad news?
Doctor: They’re under your pillow.

I don’t care what research says...I know this solution will cure me! I mix red wine with green peppers, peach pits, eagle egg yolks, celery salt, lemon juice, blueberries, salsa, yogurt, feta cheese, and Twinkies. It tastes really horrible so I know it works. So far, so good!!
California Hospitals and Health Systems With Great Oncology Programs

Written by Molly Gamble and Anuja Vaidya | February 22, 2013 | Print | Email

Becker's Hospital Review has named "100 Hospitals and Health Systems With Great Oncology Programs." These 10 hospitals excerpted from the list are located in California and are on the cutting edge of cancer treatment, prevention and research, and the Becker's Hospital Review editorial team selected them based on clinical accolades, quality care and contributions to the field of oncology. These hospitals have been recognized for excellence in this specialty by reputable healthcare rating resources, including U.S. News & World Report, Thomson Reuters, the National Cancer Institute, the American College of Surgeons, the American Nurses Credentialing Center and CareChex. Each organization has demonstrated a focus on patient-centered cancer care and emphasis on continual innovation in treatments and services. Many of these organizations also have a place in the history of cancer prevention and research, as they've driven groundbreaking discoveries and made clinical milestones.

Note: This list is not an endorsement of included hospitals or associated healthcare providers, and hospitals cannot pay to be included on this list. The following content should be used for informational purposes only and is not intended to substitute professional medical advice. Hospitals and health systems are presented in alphabetical order.

Cedars Sinai Medical Center (Los Angeles). [https://www.cedars-sinai.edu/Patients/Programs-and-Services/Cancer-Institute/] The Samuel Oschin Comprehensive Cancer Institute at Cedars Sinai offers patients a hub model comprised of multidisciplinary teams. Tumor boards, organized by specific types of cancer, help patients design treatment plans. Patients also have access to Cedars Sinai's 24-hour outpatient cancer center, which treats more than 9,000 patients each year. The center is home to basic oncology research, along with clinical trials. In October, it launched a project in partnership with Baltimore-based Johns Hopkins Medicine that allows all men diagnosed with prostate cancer to have their disease tracked in a secure and interactive online patient portal.

City of Hope National Medical Center (Duarte, Calif.). [https://www.cityofhope.org/homepage] City of Hope National Medical Center, an independent medical and research center, was founded in 1913 and is located about 20 miles outside of Los Angeles. It's one of 41 National Cancer Institute-designated Comprehensive Cancer Centers and a founding member of the National Comprehensive Cancer Network. Several breakthrough cancer drugs, including Herceptin and Avastin, are based on technology that was pioneered by City of Hope, and the center's division of clinical cancer genetics has been instrumental in understanding cancer's genetic roots.

Eisenhower Medical Center (Rancho Mirage, Calif.). [https://www.emc.org/health-services/eisenhower-lucy-curci-cancer-center-of-excellence/] The Eisenhower Lucy Curci Cancer Center, a recipient of the Outstanding Achievement Award from the American College of Surgeons Commission on Cancer, treats roughly 3,000 newly diagnosed cancer patients each year. The center includes specific centers for prostate cancer, breast care and cancer, infusion services and radiation oncology. Through its affiliation with Stan-
ford Cancer Center, Eisenhower Medical Center also offers patients access to National Cancer Institute-endorsed Phase III clinical trials.

**Hoag Memorial Hospital Presbyterian (Newport Beach, Calif.):** [https://www.hoag.org/specialties-services/cancer/] The Hoag Family Cancer Institute, a recipient of the Outstanding Achievement Award from the American College of Surgeons Commission on Cancer, treats more than 3,300 newly diagnosed patients each year, making it the largest-volume provider in Orange County. This past spring, Hoag began enrolling patients in a new late-stage clinical trial for glioblastoma multiforme, an aggressive form of brain cancer. Each year, more than 400 patients participate in the center's hereditary cancer program, which helps patients assess their cancer risk through genetic testing.

**Ronald Reagan UCLA Medical Center (Los Angeles):** [http://www.cancer.ucla.edu/] Jonsson Comprehensive Cancer Center at Ronald Reagan UCLA Medical Center has more than 240 researchers and clinicians. Some successful targeted therapies — treatments that inhibit the growth mechanisms in tumors — like Herceptin were developed based on research conducted at the center. The center has maintained its designation as a Comprehensive Cancer Center by the National Cancer Institute since 1976.

**Stanford (Calif.) Hospital & Clinics:** [http://med.stanford.edu/cancer.html] More than 300 physicians participate in cancer care, translational medicine and clinical research at Stanford Cancer Institute, which offers more than 250 active clinical trials. The institute is currently recruiting for a clinical trial that aims to identify and characterize novel proteins and genes in head and neck cancer. Stanford Cancer Institute is a National Cancer Institute-designated Comprehensive Cancer Center — one of approximately 40 in the country.

**University of California Davis Medical Center (Sacramento):** [http://www.ucdmc.ucdavis.edu/cancer/] The University of California Davis Cancer Center focuses on both clinical care and research. In 2012, UC Davis researchers discovered a new target for lung cancer treatment. The cancer center is also dedicated to understanding why cancer affects people differently, and it established a Population Sciences and Health Disparities Program to further its findings. The University of California Davis Medical Center was named to the 2012-2013 list of top-ranked hospitals for cancer by *U.S. News & World Report*.

**University of California San Diego Medical Center:** [https://health.ucsd.edu/specialties/cancer/about/locations/Pages/default.aspx] The University of San Diego Moores Cancer Center, established in 1979, is comprised of two structures — a three-story facility for clinical services and a five-story research tower. The center is one of only 41 National Cancer Institute-designated Comprehensive Cancer Centers in the country, and the University of California San Diego Medical Center was also ranked among the top 50 hospitals nationwide for cancer care in 2012-2013 by *U.S. News & World Report*.

**University of California San Francisco Medical Center:** [http://cancer.ucsf.edu/] In 2011, the University of California San Francisco Helen Diller Family Comprehensive Cancer Center diagnosed 6,453 individuals with cancer, and its investigators led 262 interventional trials, according to the most recent data available. The center has more than 370 medical professionals, including faculty investigators in laboratory, clinical and population-based research. The center is a member of the Association of American Cancer Institutes, a group made up of leading research centers in the nation that focus on cancer treatment, patient care and
community outreach, as well as the National Comprehensive Cancer Network, an alliance of 21 of the world's leading cancer centers.

**USC Norris Comprehensive Cancer Center (Los Angeles).** [https://uscnorriscancer.usc.edu/] The USC Norris Comprehensive Cancer Center is home to more than 200 scientists and physicians. The cancer center was one of the first eight National Cancer Institute-designated Comprehensive Cancer Centers in the country. Over the years, it has been responsible for many important scientific advances in cancer research, including clarifying the links between steroid hormones and breast and prostate cancer. More recently, research identifying certain genes that have to be turned off for cancer cells to survive, conducted at the center, was named one of the 20 major advances in cancer research in 2012 by the American Society of Clinical Oncology.

**Prostate Cancer Terms to Know:**

- **Oncologist** - A doctor who specializes in treating cancer. Some oncologists specialize in a particular type of cancer treatment. For example, a radiation oncologist specializes in treating cancer with radiation.
- **Androgen** - A type of hormone that promotes the development and maintenance of male sex characteristics. Stimulates prostate function and prostate cancer growth.
- **Transurethral prostatectomy** - Also called a transurethral resection of the prostate or TURP.
- **Active Surveillance** - Active surveillance is an option offered to patients with very low-risk prostate cancer (low grade, low stage, localized disease). Patients are monitored carefully over time for signs of disease progression. A PSA blood test and digital rectal exam (DRE) and prostate biopsy are performed at physician-specified intervals. Signs of disease progression will trigger immediate active treatment.
- **Nerve sparing** - A surgical technique during a prostatectomy where one or both of the neurovascular bundles controlling erections are spared. The utilization of this procedure is governed by the extent of the cancer and the skill of the surgeon.
- **Radical prostatectomy** - Surgery to remove the entire prostate. The two types of radical prostatectomy are retropubic prostatectomy and perineal prostatectomy.
- **Incontinence** - Inability to control the flow of urine from the bladder (urinary incontinence) or the escape of stool from the rectum (fecal incontinence).
- **Screening** - Checking for disease when there are no symptoms.
- **Brachytherapy** - A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near a tumor. Also called internal radiation, implant radiation, or interstitial radiation therapy.
- **Tumor** - A mass of excess tissue that results from abnormal cell division. Tumors perform no useful body function. They may be benign (not cancerous) or malignant (cancerous).
- **PSA** - prostate-specific antigen (PSA): A substance produced by the prostate that may be found in an increased amount in the blood of men who have prostate cancer, benign prostatic hyperplasia, or infection or inflammation of the prostate.

Related/Background: [https://goo.gl/oDkIj0](https://goo.gl/oDkIj0)

**PET scan centers in California CA** [http://www.petscanworld.org/find/CA_California]
**NETWORKING**

The original and most valuable activity of the INFORMED PROSTATE CANCER SUPPORT GROUP is “networking”. We share our experiences and information about prevention and treatment. We offer our support to men recently diagnosed as well as survivors at any stage. Networking with others for the good of all. Many aspects of prostate cancer are complex and confusing. But by sharing our knowledge and experiences we learn the best means of prevention as well as the latest treatments for survival of this disease. So bring your concerns and join us.

Please help us in our outreach efforts. Our speakers bureau consisting of Lyle LaRosh, Gene Van Vleet and George Johnson are available to speak to organizations of which you might be a member. Contact Gene 619-890-8447 or gene@ipcsg.org to coordinate.

Member and Director, John Tassi is the webmaster of our website and welcomes any suggestions to make our website simple and easy to navigate. Check out the Personal Experiences page and send us your story. Go to: http://ipcsg.org

Our brochure provides the group philosophy and explains our goals. Copies may be obtained at our meetings. Please pass them along to friends and contacts.

Ads about our Group are in the Union Tribune 2-3 times prior to a meeting. Watch for them.

**FINANCES**

We want to thank those of you who have made special donations to IPCSG. Remember that your gifts are tax deductible because we are a 501(c)(3) non-profit organization.

We again are reminding our members and friends to consider giving a large financial contribution to the IPCSG. This can include estate giving as well as giving in memory of a loved one. You can also have a distribution from your IRA made to our account. We need your support. We will, in turn, make contributions from our group to Prostate Cancer researchers and other groups as appropriate for a non-profit organization. Our group ID number is 54-2141691. Corporate donors are welcome!

If you have the internet you can contribute easily by going to our website, http://ipcsg.org and clicking on “Donate” Follow the instructions on that page. OR just mail a check to: IPCSG, P. O. Box 4201042, San Diego CA 92142
Directions to Sanford-Burnham-Prebys Auditorium
10905 Road to the Cure, San Diego, CA 92121

Take I-5 (north or south) to the Genesee exit (west).
Follow Genesee up the hill, staying right.
Genesee rounds right onto North Torrey Pines Road.
**Do not turn into the Sanford-Burnham-Prebys Medical Discovery Institute or Fishman Auditorium**

Turn right on Science Park Road. Watch for our sign here.
Turn Left on Torreyana Road. Watch for our sign here.
Turn Right on Road to the Cure (formerly Altman Row). Watch for our sign here.