Good morning, thank you very much to everybody for coming, and thank you to Gretchen and Marguerite for having me here to talk today about nipple discharge. Today what I’d like to accomplish is to tell you how we can distinguish physiologic and pathologic nipple discharge, a little bit about the workup of this problem and then the treatment.

So to start with distinguishing the – between the physiologic and pathologic nipple discharge, nipple discharge is a very common complaint of all patients coming in with breast issues, about 2 to 8% of those which are referred to breast clinics are the patients who have nipple discharge. And the truth is most of these are benign, although it’s somewhat hard to know the incidence of breast cancer in patients with nipple discharge but it ranges anywhere between 5 and 21%. But as you can see there I wrote skewed. So why is it skewed? Because most of these studies were done at patients who were referred to breast centers it’s difficult to know exactly what the incidence is in patients who are treated locally, which are actually the majority of patients in the U.S. The definition of nipple discharge varies, which I’ll talk a little bit about in the coming slides. The workup can vary, and also what is called positive by different investigators is different, so but it’s somewhere in about the 10% range, which means 90% of nipple discharge is benign.

So there are several different ways to categorize nipple discharge and one of the ones that I’ve seen described commonly is physiologic versus pathologic discharge. And these can help determine the management for, for patients. So physiologic discharge is non-spontaneous, which means it’s inducible, the woman is doing some manipulation to her breast in order for the nipple discharge to occur. It’s generally bilateral, comes from multiple ducts, more likely to be green, tan or white and
it’s not surgically treated. And here is a picture of a nipple with multiple different colors of nipple discharge coming out of it.

Alternatively pathologic nipple discharge is usually spontaneous, meaning that woman will see it either when she’s in the shower or on her bra or her pajamas, it’s much more likely to be unilateral, from one single duct, bloody or watery, which we’ll discuss further in a few more slides. And that one is surgically treated. So some people actually divide instead of saying physiologic, pathologic, some people call it not treated surgical by a breast surgeon and surgically treated by a breast surgeon. So here you can see a discharge from, from a single duct. And I just wanted to comment down here, nipple discharge in males is not normal and should be referred to a breast surgeon.

So let’s talk first a little bit more about physiologic nipple discharge, which was the one on the left in the previous slide. So in 50% of patients the reason why it occurs is idiopathic, we simply don’t know. But a lot of times it can actually be caused by breast stimulation, irritation, trauma, which can even include some biopsies can cause this. Pregnancy can actually cause nipple discharge. In the first trimester it’s not uncommon to get clear or straw colored discharge. And shortly before a woman delivers she can sometimes have thin and milky discharge which is also known as colostrum.

There are several different reasons in the endocrine field why a woman would have physiologic nipple discharge and again this would be from both breasts, multiple ducts and the most common is increased prolactin production, which is usually caused by a prolactin adenoma, which is a benign
tumor of the anterior pituitary. It can also be caused by ectopic prolactin production, for example from bronchogenic cancer of the lung. And so that’s one of the reasons why I don’t love the terminology physiologic because that makes it suggest that it’s never from a cancerous cause, but it’s not something that a breast surgeon would be able to help with.

Another endocrine cause of nipple discharge is hypothyroidism. It can also be caused by medications, herbal medications as well or treatments and drugs, it can be caused by renal failure and also head trauma. And this slide shows different medications, herbals and also street drugs that can sometimes cause nipple discharge. And I think it’s underappreciated how commonly antidepressants are – can cause nipple discharge and it’s – this would be again physiologic from both nipples, but also antihypertensives, anxiolytics, antipsychotics, HER2 receptor agonists, and you can see the rest of the list there but it’s actually a very large number of drugs that can cause nipple discharge. And of course sometimes people forget to ask about the other medications and natural supplements that people take, but you can see there is a big list of those that could be the reason for a woman having physiologic discharge. And also marijuana is a common reason for nipple discharge.

So now turning to pathologic discharge, what are the causes of pathologic discharge? The most common would be a papillary lesion, another one is duct ectasia, which is somewhat poorly understood but it’s an inflammation of the milk duct. And then much less commonly would be DCIS and breast cancer.
So moving on to work up, so starting again back with the physiologic nipple discharge which is the one from both nipples, usually multiple ducts. So we would start with a history and physical. You know in the distant past when women were taught how to do self breast exam they were actually encouraged to stimulate their nipples and so we’ve kind of backed away from telling women to do that, but that can be a common reason why a woman would discover nipple discharge in her breast. And so the first thing would be to tell her to stop stimulating her breasts. Any history of trauma to the breast, endocrine problems, renal problems, pregnancy and of course the medications I listed on the previous slide, and so if there is clinical suspicion a prolactin level can be drawn and if that is elevated a brain MRI would be the next step. Thyroid function tests can also be used to evaluate if there is clinical suspicion of endocrine issues related to the thyroid.

Now pathologic nipple discharge again the history and physical is very important. And there have been studies that show that age can actually help distinguish whether nipple discharge will be caused by a cancer or caused by a benign finding and age is actually a very good one. There have been studies by Dr. Morrogh which show that in a woman less than age 40 if she has nipple discharge alone with no mass there is a less than 3% chance that she would have cancer. Whereas if a woman is over the age of 60 and she has nipple discharge alone then her risk of having a cancer is actually in the 30% range, or 10 fold higher.

There is also some reports that suggest a very high volume discharge is more concerning for malignancy and if a woman has nipple discharge plus a palpable mass then that is also more concerning malignancy. So then the next step would be imaging which Dr. Spangler touched on, so
I’m going to go somewhat briefly over this. But there are multiple different tests which can be done to evaluate nipple discharge, and really none of them are optimal. And so because Dr. Spangler talked about this a little bit I won’t go into too much detail but you can see that none of the tests are perfect. And I’m going to go into a little bit more about which kind of the algorithm that we use to evaluate nipple discharge. But mammogram is used, ultrasound is used especially subareolar ultrasound. Dr. Gray ductography which I have a picture here, which is actually using a tiny videocamera to look for a lesion, and that’s something that’s been championed by groups in University of Oklahoma and also Cleveland Clinic, that’s right. And but it’s not used that commonly. And MRI can also be used.

So this is a picture of a patient that I took care of who had clear nipple discharge and on the left you can see her ultrasound and you can see some dilated ducts right here, and on her ductogram you can see the – the contrast being injected into the breast and a sudden cutoff which is compared to this which is another patient who is normal, this is what a more normal ductogram would look like. And here is another example of a patient again with dilated ducts behind the nipple. You can see here where the ultrasound probe is and again an abrupt cutoff of the dye, and a close-up of this shows that the next step was at the radiologist, biopsied it and left a clip and it turned out to be a papilloma which was then surgically excised.

So what is the workup that’s not recommended for nipple discharge? And this is probably the most important of all the slides that I’m going to show you today because this can create a lot of concern for patients with very little help to them. And so the first one is cytology, meaning sliding a slide
across the nipple to try to collect the fluid coming out of it. And as you can see here, it has a very low sensitivity and a very slow specificity. The second test that’s not recommended is a Hemoccult test of the discharge coming out of the blood, and that’s because both clear and bloody nipple discharge can be pathologic, so it doesn’t really help you differentiate whether a patient needs to have further evaluation. And this chart down here shows you 3 contemporary studies comparing the percentage of patients with bloody versus nonbloody discharge and the percentage of those patients who had pathologic nipple discharge, and you can see that really they are not much different. So a Hemoccult and cytology both don’t help so should not be routinely done.

So going through the management of nipple discharge the first step would be to determine whether the nipple discharge is spontaneous or non-spontaneous and whether its – whether the discharge is being released from multiple ducts or single ducts and whether the drainage is bloody or serous. So let’s start on the left side first. And again here I wrote physiologic versus pathologic. So the color of the discharge can help a little bit. If the discharge is milky checking a prolactin would be a good next step. If it’s purulent which happens very rarely, usually the woman has other symptoms such as a temperature, severe pain, induration or it can be green, yellow and tan. Well the first step is to stop manipulating the nipple, if she’s doing that and really she doesn’t need any further workup after that.

Whereas with a patient who has spontaneous or a single duct discharge that’s either bloody or clear the next step would be a subareolar ultrasound and if the woman is over the age of 40 then a mammogram. And then the mammogram will either be negative or positive. So if the mammogram
or subareolar ultrasound are abnormal then she would go on to image guided percutaneous biopsy or directly to a subareolar duct excision surgically. And then if the mammogram is negative or the subareolar ultrasound is negative then the next step is generally ductogram. If that’s positive again she’d go on to a biopsy, if it’s negative then really her risk of developing – of this nipple discharge being cancer is extremely low at less than 3%. So in the literature there is quite a bit of discussion about whether a woman can actually have every 6 month imaging exams or undergo subareolar duct excision. But the thought is that if a woman has completely negative imaging and a completely negative physical exam then following her is a reasonable option.

And so finally treatment, so why do we treat patients with pathologic nipple discharge, meaning from one duct? Of course the most obvious reason is for diagnosis to rule out cancer, and then also for symptoms because a continually draining nipple can get excoriated and can be very irritating for the patient and damage her clothes, etc. So how is this done? Well these are actually pictures that I got from several different sources, but the way that this operation works is that an incision is made in the subareolar region of the breast, and here you can see a little catheter being placed into the abnormal duct and some surgeons use dye at this point, to inject dye into the lesion and others actually use a probe which they keep in the duct and here you can see that – you can see a little duct exposed there. And then the duct is actually isolated and the – the duct, the abnormal duct is excised and here you can see in this picture if this is the injection of dye, this is the lacrimal probe looking straight up at you.
So I’ve covered the three things I was hoping to cover today, and so in conclusion I want to leave you with the information that nipple discharge is a relatively common problem, about 5% of patients who present with breast symptoms. The incidence of malignancy is somewhere around 10%. The really important first step is to distinguish between physiologic, which again would be bilateral, multiple ducts versus pathologic which would be a single duct, non-spontaneous, bloody or serous. Imaging has variable sensitivity and specificity, and the first imaging test would be a subareolar ultrasound, avoid cytology and Hemoccult and then there is an option for a low suspicion pathologic nipple discharge meaning no mass, normal imaging for observation with additional imaging. And that’s it. Thanks.