Thyroid Nodules: the real story
Dr. Ken Cathcart

Thyroid nodules epidemiology
In studies done in the US of unselected populations with high resolution ultrasound showed that 72% of women and 41% of men in the study had documented nodules by ultrasound.
A similar study done in Finland looking at patients between age 19-50 years of age showed increasing frequency of nodules each decade of life with 70% less than 1 cm in size.

Autopsy studies done on patients under the age of 65 show that 57% of those patients had thyroid nodules.
If one includes patients above 65 the number may be as high as 75%.

Thyroid nodules the fear
Almost every patient that is told that they have a mass in their body fears that this is cancer. The younger the age the greater the fear.
This thought process also extends to health care providers of any type as multiple studies have shown.

Thyroid nodules the facts
If one looks at the 2 best studies of thyroid nodules and risk of malignancy occurred in North Carolina and Catania Italy.
The rate of thyroid cancer in North Carolina was 6.5% and the rate in Catania Italy was 5%.
In each of these studies the diagnosis was confirmed by true surgery not FNA.

Excellent autopsy studies done here in the US show that on careful dissection of thyroid glands at autopsy 6-13% of all patients had papillary thyroid cancer that was a microcarcinoma.
In Finland this number reaches 36% of the autopsied specimens.
Thyroid nodules the facts

- We have multiple studies that show that papillary thyroid cancers of less than 1 cm do not kill anyone and that local recurrence is also very uncommon.
- Recently the ATA has moved to embrace the concept of observation for micro-papillary thyroid.

The Japanese studied 1413 patients in 2 independent prospective studies that involved the classic aggressive surgery versus no surgery and then simple observation yearly.

- As I will show you on the next slide deferred therapy was very effective.

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### Micro-Papillary thyroid cancer

<table>
<thead>
<tr>
<th></th>
<th>Surgical resection (10-20 yr)</th>
<th>Active surveillance 5 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>mortality</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Local recurrence</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Distant metastases</td>
<td>1%</td>
<td>&lt;1%</td>
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Thyroid nodules the facts

- In 2016 the ATA convened a special panel of Thyroid cancer experts to address the explosion of thyroid cancers since 2002.
- From 1975 until 2002 the incidence of thyroid cancer was steady in the US at approximately 6.5 cases per 1,000,00 people.
- But from 2002 to 2010 the rate TRIPLED.

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Thyroid nodules the facts

- Over that times span the incidence of greater than 4 cm tumors was unchanged at ~ 10%.
- The incidence of > 2 cm tumors fell from 42% to 33%.
- The incidence of < 1 cm tumors went from 25 to 39%.
- Yet death from thyroid cancer did not change while the rate of thyroid cancer recurrence fell.

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What does this mean?

- The problem is ultrasound and Head/neck imaging finding nodules that are not significant for further diagnostic work up.
Ultrasound Characteristic

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sensitivity</th>
<th>Specificity</th>
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</thead>
<tbody>
<tr>
<td>Microcalcification</td>
<td>44%</td>
<td>89%</td>
</tr>
<tr>
<td>Hypoechoic</td>
<td>81%</td>
<td>53%</td>
</tr>
<tr>
<td>Solid</td>
<td>86%</td>
<td>18%</td>
</tr>
<tr>
<td>Absence of halo</td>
<td>66%</td>
<td>54%</td>
</tr>
<tr>
<td>Poorly defined margins</td>
<td>55%</td>
<td>79%</td>
</tr>
<tr>
<td>Intranodule vascularity</td>
<td>62%</td>
<td>77%</td>
</tr>
<tr>
<td>Tall &gt; wide</td>
<td>48%</td>
<td>92%</td>
</tr>
</tbody>
</table>

Why is this true?

- In the 1990s we had the same problem with breast ultrasounds
- The radiologist, breast surgeons, and oncologists all had a different system to rate breast ultrasound risk the result huge number of biopsies done for no reason
- Eventually they all got together agreed on one standard and the BIRADS system was born

Thyroid ultrasound

- Right now there are at least 6 different versions in North America used to define risk thyroid nodules by ultrasounds
- TIRADS – Horvath, TIRADS-Kwak, TIRADS-Ross/Leenhardt, TIRADS-Kwak modified are all commonly used in the US not surprisingly a recent study by the ATA showed a “controlled” ultrasound was interpreted as highly suspicious and low risk by different readers

Thyroid nodules the facts

- The extremely high rate of nodules being discovered by radiographic studies and the lack of any consistent interpretation by ultrasound has led the ATA and the AACE to make the following blanket statement do not biopsy nodules less than 1 cm in size

So what do I need to know

- The ATA has divided nodules into 3 broad groups high, intermediate and low risk nodules
- The high risk group includes anyone that has prior head and irradiation, a nodule 4 or greater cm in maximum diameter, a nodule in someone that has prior thyroid cancer, or a nodule in someone with known MEN 2 syndrome

So what do I do now

- High risk nodules should be surgically removed even if the FNA is not considered malignant
- The last member of this group would be nodules that have 2 non-diagnostic FNA
So what do I do

- Low risk nodules are as follows: nodules less than or equal to 8 mm, nodules that are unchanged in size for 5 or more years, biopsy negative nodules that are not growing, cystic nodules,
- No further diagnostic testing is needed unless nodule changes on physical exam or patient with symptoms

All other nodules are in the intermediate risk

- These nodules should have a TSH and then a FNA biopsy
- If the TSH is suppressed the FNA should be put on hold until a RAI scan shows if the nodule is functioning or not
- Pregnancy is controversial as to the approach

The biopsy if negative excludes papillary, medullary and anaplastic carcinoma

- There are no current tests that differentiate follicular cancer and follicular adenoma
- Thus all nodules need to be followed by serial physical exams to be sure they are not changing for at least 5 years

references

- Davies JAMA 2014: 140:317
- Mandel Clinical Endocrine update 2016:465-477