

# Treatment Decisions and Adherence to Guidelines in the Treatment of Low Risk Papillary Carcinoma of the Thyroid

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**ABSTRACT:** **Background:** Treatment guidelines for well-differentiated papillary thyroid carcinoma (PTC) are based on retrospective studies and vary among professional thyroid associations.

**Objectives:** To evaluate physician adherence to guidelines, overall and by specialty.

**Methods:** Questionnaires on the approach to low risk PTC were distributed among 51 surgeons and endocrinologists treating patients with PTC in tertiary medical centers.

**Results:** A wide range of answers was recorded among physicians regarding the danger posed by low risk PTC to the patient's life, urgency with which treatment should be administered, type of treatment, and risks associated with this treatment. There was a significant between-group difference in treatment preference: endocrinologists chose total thyroidectomy with radioactive iodine, while surgeons favored hemithyroidectomy alone.

**Conclusions:** There is a wide difference in treatment recommendations between treating physicians and different specialties with regard to low risk PTC. The wide variation within and between specialties may be explained by biases.

*IMAJ* 2014; 16: 548–552

**KEY WORDS:** guidelines, thyroid carcinoma, thyroidectomy, hemithyroidectomy, radioactive iodine

biases. To overcome these biases, physicians veer toward a reliance on evidence-based findings rather than intuition-based expert opinion. The evidence is also weighted according to the level of validity [3]. Thus, studies that represent expert opinion are valued less than studies that average data from large-scale clinical trials [4]. Although professional teams have written management guidelines using the relevant data published in the literature, studies have repeatedly shown that physicians do not always adhere to them [5]. There is evidence for over-utilization of some treatments, even if not very effective, and under-utilization of other, effective, ones [6]. This over- and under-use may be attributed to biases.

Although treatment decisions that diverge from professional guidelines may in some cases reflect conditions specific to the individual case in question, in other cases this diversion may reflect the physician's bias. Bias can also be the explanation for over- and under-use of some treatment modalities.

The evidence base for the treatment of low risk (early) papillary thyroid carcinoma is wide [7,8], but it is only level B, that is, derived from retrospective (not prospective) and uncontrolled studies. Analyzing the outcome in 42,686 patients with papillary carcinoma registered in the National Cancer Database, Hundahl et al. [7] showed that confined unifocal tumors measuring up to 4 cm have an excellent prognosis and 10 year survival rate (above 95%), and a low recurrence rate (< 10%) – regardless of the extent of surgery. At the same time, Bilimoria et al. [8] reported a higher recurrence rate and lower survival in patients with tumors larger than 1 cm treated with hemithyroidectomy compared to total thyroidectomy (although the differences remained small for tumors up to 3 cm). Given the delicate equilibrium between the added advantages of total thyroidectomy against its added risk of greater morbidity, specific guidelines addressing the extent of surgery in patients with low risk tumors differ from country to country. Even within the United States, the National Comprehensive Cancer Network enables hemithyroidectomy for papillary carcinomas up to 4 cm in young patients with no other risk factors [9], and the American Thyroid Association does so only for tumors up to 1 cm [10]. Almost all other national guidelines enable hemithyroidectomy for tumors measuring 1 cm or less in a favorable host but do not rule out total thyroidectomy with adjuvant radioactive iodine treatment [10,11].

Advances in medical technologies and pharmaceuticals in recent years have provided physicians with a wide range of treatment choices. Each has advantages and disadvantages. Choosing the best treatment involves a complex process of weighing outcomes against side effects and risks as well as the effect that the choice will have on the quality of life. In their Nobel prize-winning studies, Kahneman and Tversky [1] showed that people tend to make mistakes when reaching decisions in uncertain conditions (such as more than one treatment option). They suggested that heuristics or biases programmed into human behavior may lead to intuitive reactions instead of a logically calculated mode of action. This is apparently true in medicine as well [2]. Physicians faced with more than one treatment option may select wrongly because of preexisting

In this situation where guidelines allow for two treatment options, the present study evaluates physicians' preference and evaluates differences between surgeons and endocrinologists. Possible factors that may influence treatment decisions are discussed.

**PATIENTS AND METHODS**

A six-item questionnaire evaluating the treatment options for low risk papillary thyroid carcinoma was administered to 51 physicians (15 surgeons and 36 endocrinologists) who regularly treat patients with thyroid cancer at tertiary medical centers. The participants were told that this was a survey to evaluate treatment choices, but not that the main focus was to identify inter-specialty differences. The following points were investigated and compared between the participating physicians:

- Physicians' evaluation of the danger imposed by the disease on affected patients
- Urgency with which treatment should be administered
- The extent of treatment needed
- Morbidity associated with each of the possible treatments.

The different responses to each question were calculated for the whole group and for surgeons and endocrinologists separately. Fisher's exact test (SPSS ver. 15 and WinPepi ver. 11.18) was used to compare the responses by medical specialty. Risk assessments were clustered into two groups, and 2 x 2 crosstabs were used to correlate risk assessments with treatment decisions. A P value < 0.05 was considered statistically significant.

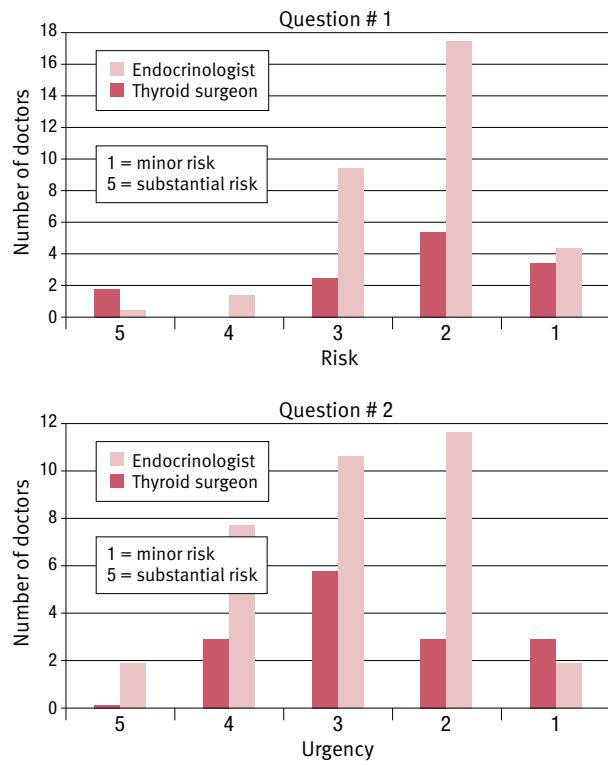
**RESULTS**

The six items are:

- **Question 1 [Figure 1]: To what extent does low risk papillary carcinoma jeopardize patient health?**  
Question 1 was graded on a scale from 1 (lowest threat) to 5 (highest). The responses of the study sample were characterized by a wide variation. Nine physicians considered low risk papillary carcinoma of the thyroid a grade 1 threat while three physicians considered it a grade 5 threat. There was no significant difference in responses between surgeons and endocrinologists.
- **Question [Figure 1]: How urgently should treatment be administered in low risk papillary carcinoma?**  
This question was graded on a 5 point scale, similar to question 1, with a similarly wide distribution of responses and no significant difference by medical specialty.
- **Question 3 [Figure 2]: What would be your therapeutic approach to a 40 year old woman with an incidental finding of a 10 mm thyroid nodule shown to be papillary carcinoma by fine-needle aspiration?**

**Figure 1.** Response of surgeons (n=15) and endocrinologists (n=36) to questions 1 and 2 in a survey on attitudes to early low risk papillary thyroid carcinoma

1. To what extent does early papillary carcinoma jeopardize patient health?
2. How urgently should treatment be administered in low risk papillary carcinoma?

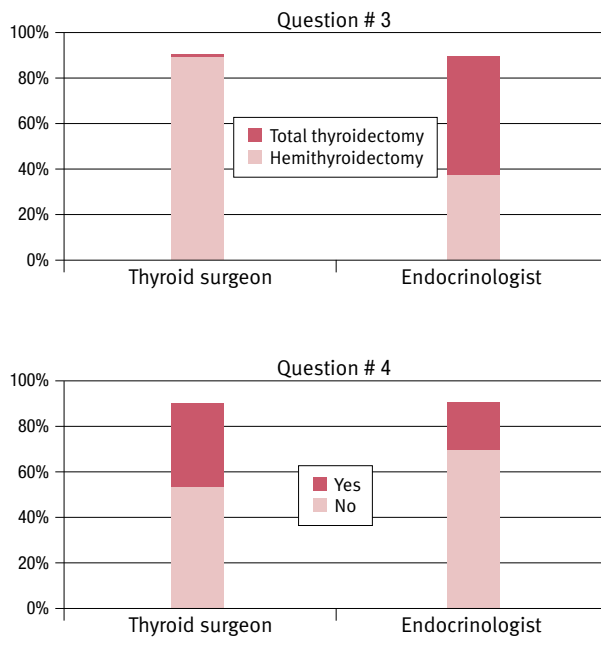


All the surgeons chose hemithyroidectomy as the treatment of choice, whereas the endocrinologists were split, with 15 advocating hemithyroidectomy and 21 total thyroidectomy. The difference between the physician groups was statistically significant (P < 0.001).

- **Question 4 [Figure 2]: Is adjuvant radioactive iodine treatment necessary if the pathological examination reveals a single 10 mm focus with no extra-thyroid extension and ultrasound showing no lymphadenopathy?**  
The range of answers was wide. Although all surgeons voted for hemithyroidectomy, some advocated radioiodine adjuvant treatment when specifically asked. There was no statistically significant difference between surgeons and endocrinologists.
- **Question 5 [Figure 3]: What is the surgical risk of total thyroidectomy vs. hemithyroidectomy?**
- **Question 6 [Figure 3]: To what degree does radioactive iodine treatment decrease quality of life?**

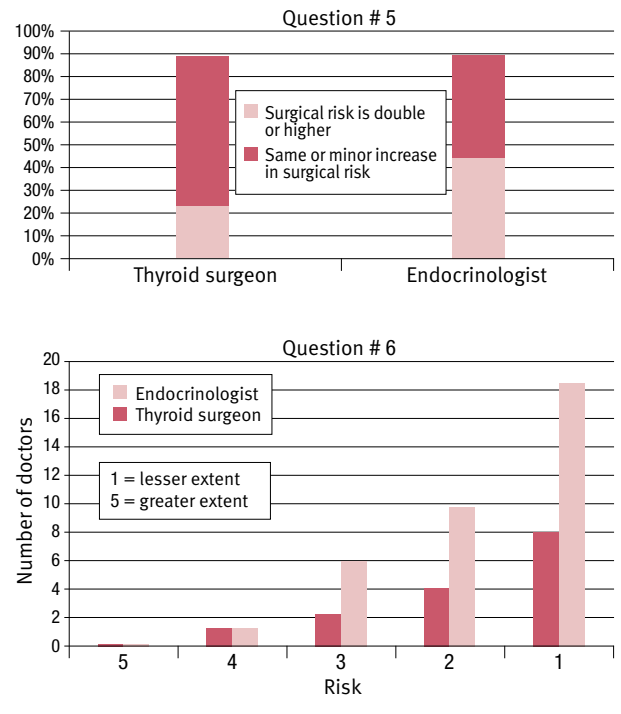
**Figure 2.** Response of surgeons (n=15) and endocrinologists (n=36) to questions 3 and 4 in a survey on attitudes to early low risk papillary thyroid carcinoma

3. What would your therapeutic approach be to a 40 year old woman with an incidental finding of a 10 mm thyroid nodule shown to be papillary carcinoma by fine-needle aspiration?
4. Is adjuvant radioactive iodine treatment necessary if the pathological examination reveals a single 12 mm focus with no extra-thyroid extension and ultrasound shows no lymphadenopathy?



**Figure 3.** Response of surgeons (n=15) and endocrinologists (n=36) to questions 5 and 6 in a survey on attitudes to early low risk papillary thyroid carcinoma

5. What is the surgical risk of total thyroidectomy vs. hemithyroidectomy?
6. To what degree does radioactive iodine treatment decrease quality of life?



For question 5, physicians were asked to choose between two possible answers: “Total thyroidectomy has double the risk of hemithyroidectomy” or “Total thyroidectomy has a slightly higher risk than hemithyroidectomy.” For question 6, physicians rated the decrease they would expect in patients’ quality of life on a scale of 1 to 5. Similar to questions 1–4, there was wide variability in responses, with no significant difference by medical specialty.

Figure 4 shows the correlation between evaluations of the tumor-associated risk and choice of treatment. No correlation was found between the responses to question 1 (gravity of the disease) and question 3 (extent of recommended treatment). There was a trend toward significance in the relationship between question 5 (surgical risk associated with total thyroidectomy) and choice of treatment, with more physicians who regard total thyroidectomy as affecting quality of life recommending hemithyroidectomy ( $P = 0.08$ ). Similarly, more physicians who thought radioactive iodine was associated with low morbidity recommended treatment with adjuvant radioactive iodine ( $P = 0.051$ ).

## DISCUSSION

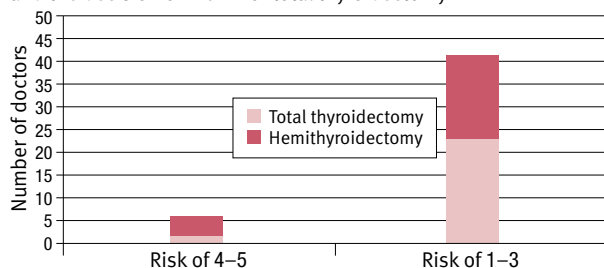
Decision making in many areas, including medicine [6], is influenced by biases. In order to help physicians make the right treatment decision and overcome personal biases, guidelines (determined by experts and based on high volume data) have been published. Nonetheless, repeated studies show that physicians often fail to adhere to written guidelines [5].

The present study sought to: a) determine if physicians who encounter patients with papillary cancer on a daily basis are uniform in their attitudes and treatment choices for patients with low grade papillary carcinoma, and b) evaluate differences between surgeons and endocrinologists. In the absence of prospective double-blind controlled studies the preferred extent of surgery for low risk papillary carcinomas remains unclear. Current treatment guidelines are based on large-scale multicenter retrospective studies [8-11] and allow for a wide range of treatment options from hemithyroidectomy to total thyroidectomy with adjuvant radioactive iodine.

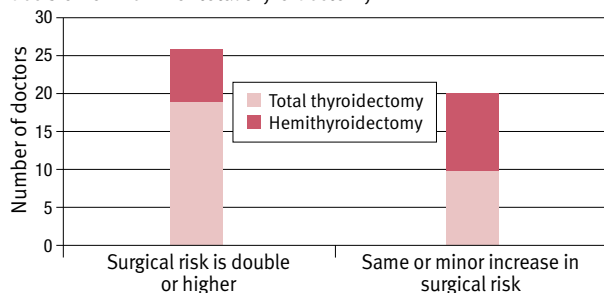
Data for the present study were derived from a six-item questionnaire distributed to 51 physicians treating patients

**Figure 4.** Correlation of opinions of surgeons and endocrinologists regarding the threat of papillary thyroid carcinoma to patient health and their treatment recommendations

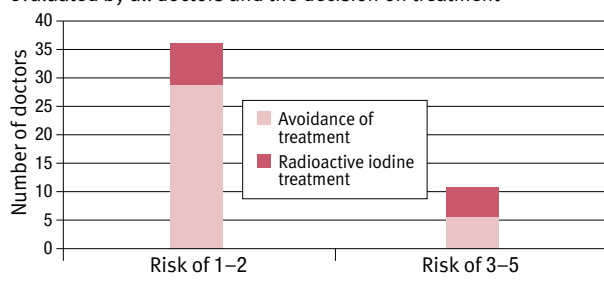
Correlation between the assessment of PTC-associated risk and the decision on hemi- or total thyroidectomy



Correlation between the assessment of surgery risk and the decision on hemi- or total thyroidectomy



Correlation between the risk of radioactive iodine treatment evaluated by all doctors and the decision on treatment



with papillary carcinoma of the thyroid on a daily basis. The questionnaire examined the approach and treatment recommendation for low risk papillary cancer patients. Correlations between treatment recommendations and the risk assessment of the tumor and treatment as perceived by the physician were performed.

The first and most interesting observation was the wide range of answers obtained for most questions. Physicians showed a wide variation in response to five of the six questions pertaining to the threat of the disease, patient quality of life, the urgency with which treatment was needed, the need for adjuvant radioactive iodine, and the risks associated with radical surgery and radioactive iodine, with no differences by medical specialty.

For a 10 mm papillary carcinoma in the absence of other compromising factors, there was a clear difference by medical specialty in the recommended treatment, with endocrinologists preferring total thyroidectomy and surgeons hemithyroidectomy. Although both the NCCN and ATA as well as many of the European guidelines allow for hemithyroidectomy in these cases [10,11], half the endocrinologists opted for a more radical solution. Furthermore, the lack of correlation between the responses regarding gravity of the disease and its treatment indicates that physicians who thought papillary thyroid carcinoma was a considerable threat to the patient did not necessarily opt for more extensive treatment. Physicians who opted for more extensive treatment did not necessarily believe papillary thyroid carcinoma was a considerable threat.

The concept of “risk aversion,” developed by Kahneman and Tversky [12], suggests that people strongly prefer avoiding losses to acquiring gains and that the appreciation of losses is twice as powerful as the appreciation of gains. As such, risk aversion may induce the overuse of radical measures to avoid loss. Accordingly, the choice of radical treatment by the endocrinologists may have been prompted by the fear of loss (life) associated with treating a cancer patient. At the same time, the choice of less radical treatment by the surgeons may have been prompted by a fear of loss (morbidity) that can accompany total thyroidectomy. Many studies in the field of economics show that intuition and past experience play a greater role in decision making than analytical assessment [12].

Physicians, surgeons and endocrinologists alike are exposed to the same published medical data. Still, they present wide variations in their attitude and treatment recommendations, thus reflecting possible influences or bias on the physicians’ professional practice and treatment recommendations. This has to be taken into consideration and corrected. A mathematical model may be a useful instrument to overcome these shortcomings.

**Acknowledgment**

The authors wish to thank Prof. Yossi Yassour for his guidance

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NCCN = National Comprehensive Cancer Network

ATA = American Thyroid Association

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