

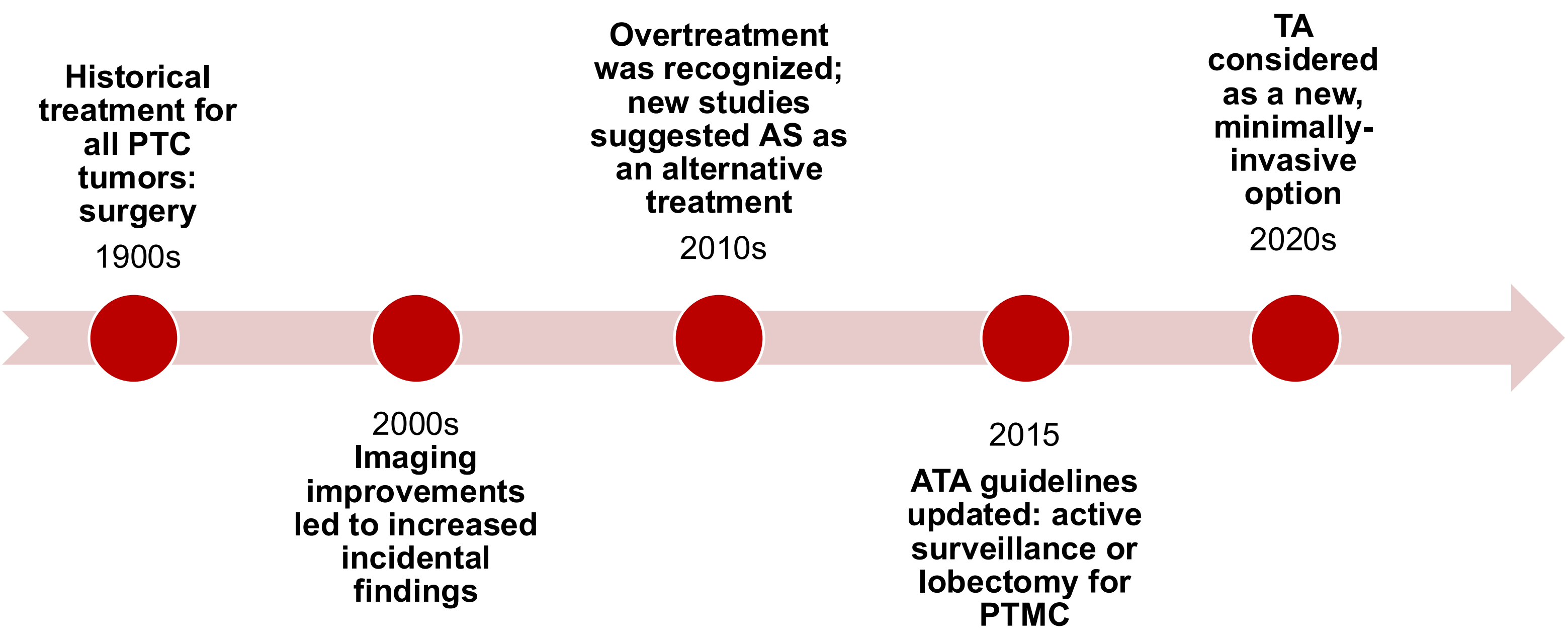
# Thermal Ablation in Papillary Thyroid Carcinoma: Bridging the Gap between Surgery and Active Surveillance



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## Introduction

- Papillary thyroid carcinoma (PTC) is the most common type of thyroid cancer. Papillary thyroid microcarcinoma (PTMC), defined as any tumor ≤1.0 cm, accounts for nearly half of all new PTC diagnoses.
- Historically, PTMC tumors were treated with surgery or radioactive iodine. In 2015, the American Thyroid Association updated the current standard of care to include surgery (lobectomy) or active surveillance (AS). Active surveillance typically includes clinic visits, ultrasounds, and possible FNAs.
- Thermal ablation (TA) has recently been proposed as a minimally-invasive treatment option for patients who desire intervention without undergoing surgery.



## Purpose

The standard of care for localized papillary thyroid microcarcinoma (PTMC), defined as tumors ≤1.0 cm or T1aN0M0, is surgery (thyroid lobectomy) or active surveillance according to most recent guidelines.<sup>1</sup> This poster explores the use of thermal ablation, primarily radiofrequency ablation (RFA), as a novel, effective treatment option for PTMC.

## Methods

A literature review was conducted using PubMed and Embase to identify prospective clinical trials, retrospective and systematic reviews, and meta-analyses evaluating the effectiveness of RFA, microwave ablation (MWA) and laser ablation (LA) compared to surgery and AS for the treatment of PTMC. Outcomes assessed included disease progression rate, volume reduction rate, quality of life (QoL), conversion to surgery, cost of treatment, and complication rates.<sup>1-16</sup>

## Results

- While active surveillance has long-term clinical outcomes comparable to initial surgery,<sup>2</sup> some studies found higher rates of lymph node metastases<sup>2</sup> and disease progression rates between 6.9-9.6%<sup>3,4</sup> that may be even higher in those <40yo.<sup>5</sup> Additionally, a significant proportion of AS patients (~7%) eventually convert to surgery, commonly due to anxiety despite stable disease.<sup>13</sup>
- Radiofrequency ablation (RFA) is a minimally-invasive treatment option that preserves thyroid function and has lower progression of disease (0-2.6%) and conversion to surgery (0-1.1%)<sup>12,6</sup> compared to AS.
- Ablation also has comparable disease progression to surgery (0.4-0.7%)<sup>2</sup> but shorter hospital stays, lower treatment costs, fewer complications, and improved psychological and health-related QoL.<sup>6,7,8</sup>
- The healthcare cost of AS compared to RFA is dependent on age at diagnosis and many other factors, but RFA (\$11,700) is generally more costly than AS (\$6,400) when comparing average 10-year cost/treatment.<sup>14</sup> Another study found lobectomy (\$19,200) to be significantly more expensive than RFA (\$8,700).<sup>15</sup>

	Active Surveillance	Radiofrequency Ablation	Surgery (Lobectomy)
Disease progression rate	6.9-9.6%*  *may be higher in those < 40yo	0-2.6%	0.4-0.7%
Conversion to surgery	7%	0-1.1%	
Complications/ Considerations	anxiety-inducing, time-consuming	temporary voice changes and difficulty swallowing have been reported	permanent hypoparathyroidism, recurrent laryngeal nerve palsy, thyroid hormone replacement, infection, bleeding, scar
US cost estimates	\$6,400 (10-year estimate)	\$8,700-11,700	\$19,200

Figure 1: Outcomes of Active Surveillance (AS), Radiofrequency Ablation (RFA), and Thyroid Lobectomy for the treatment of PTMC

## Results cont.

- RFA is the most common form of TA performed for PTMC and is superior to microwave ablation (MWA) and laser ablation (LA) in terms of 12-month volume reduction, lymph node metastases, and complication rates.<sup>9</sup>
- Notably, LA has the highest complete disappearance rate (93%) compared to RFA (81%) and MWA (71%).<sup>9</sup>

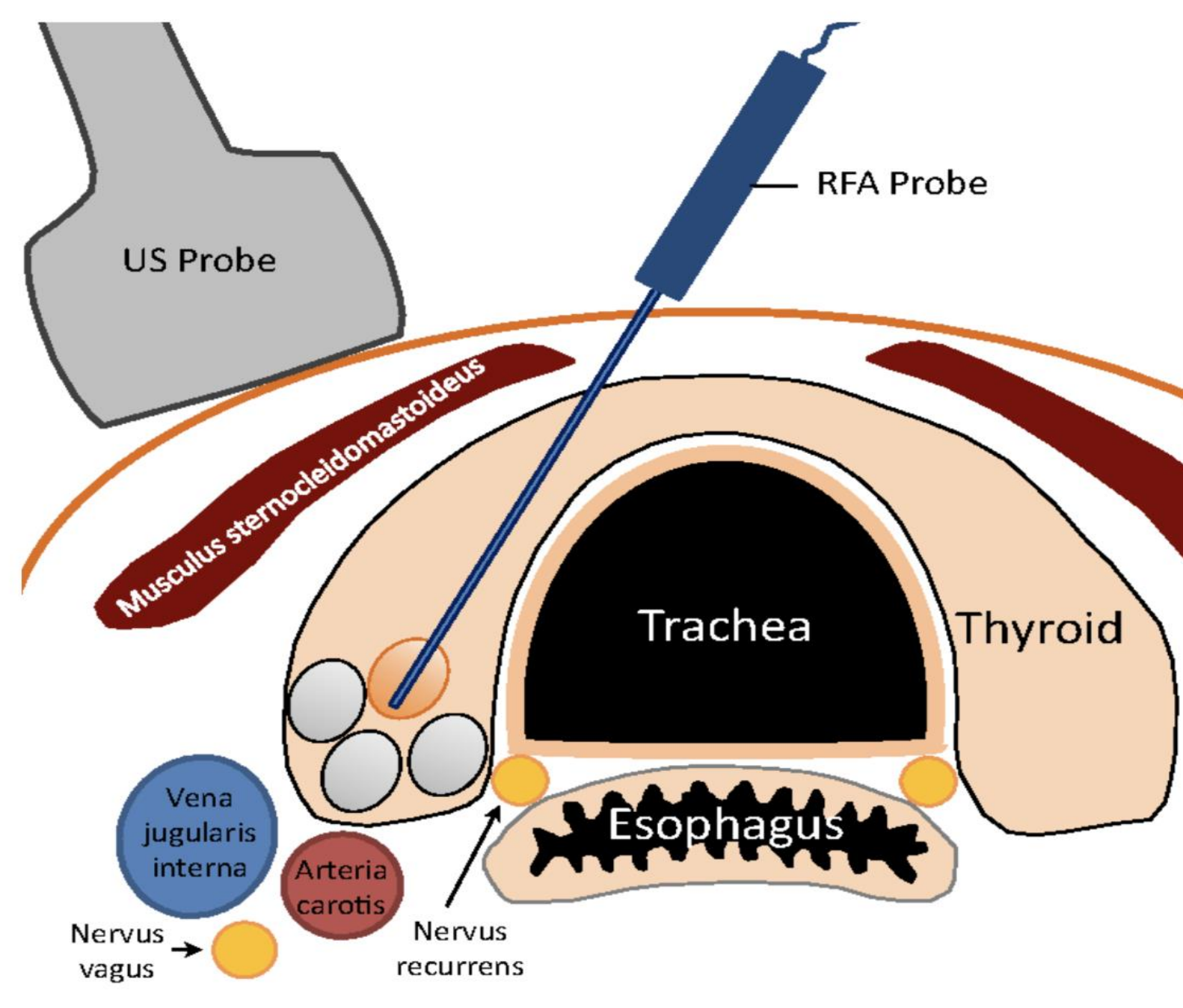


Figure 2: Thyroid Anatomy and RFA approach. Image from Franz et al<sup>16</sup>

## Discussion

- Thermal ablation is a minimally-invasive, effective treatment option for PTMC with equivalent or improved outcomes compared to the current standard of care, specifically for patients younger than 40yo.
- While complications are rare, short-term voice changes and difficulty swallowing have been reported and should be investigated further.<sup>10</sup>
- RFA use in PTC tumors 1.0-2.0cm (T1bN0M0) is still controversial, and more studies with long-term follow up are needed.<sup>11</sup>

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