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Introduction

Risk stratification of the well-differentiated thyroid cancer (WDTC) was proposed by the American Thyroid Association (ATA) based on clinical, radiological, and biochemical responses to the initial therapy.^{1,2} The present study compares their correlation with the disease-specific (DSS) and the relapse-free survival (RFS) of WDTC in patients, as compared to the clinical and radiological evidence of the completeness of resection, in patients treated with total thyroidectomy with or without adjuvant radioactive iodine.

Patients

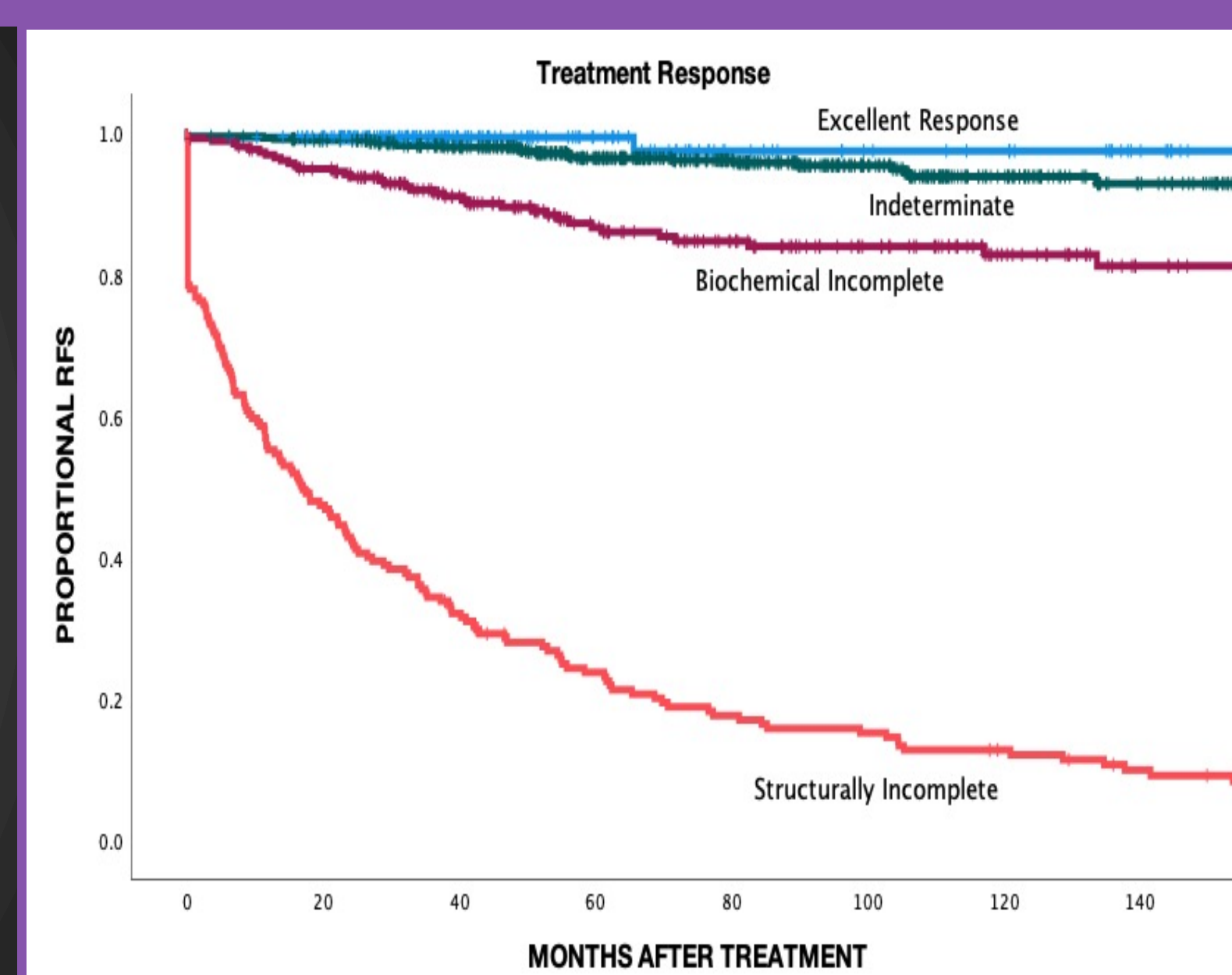
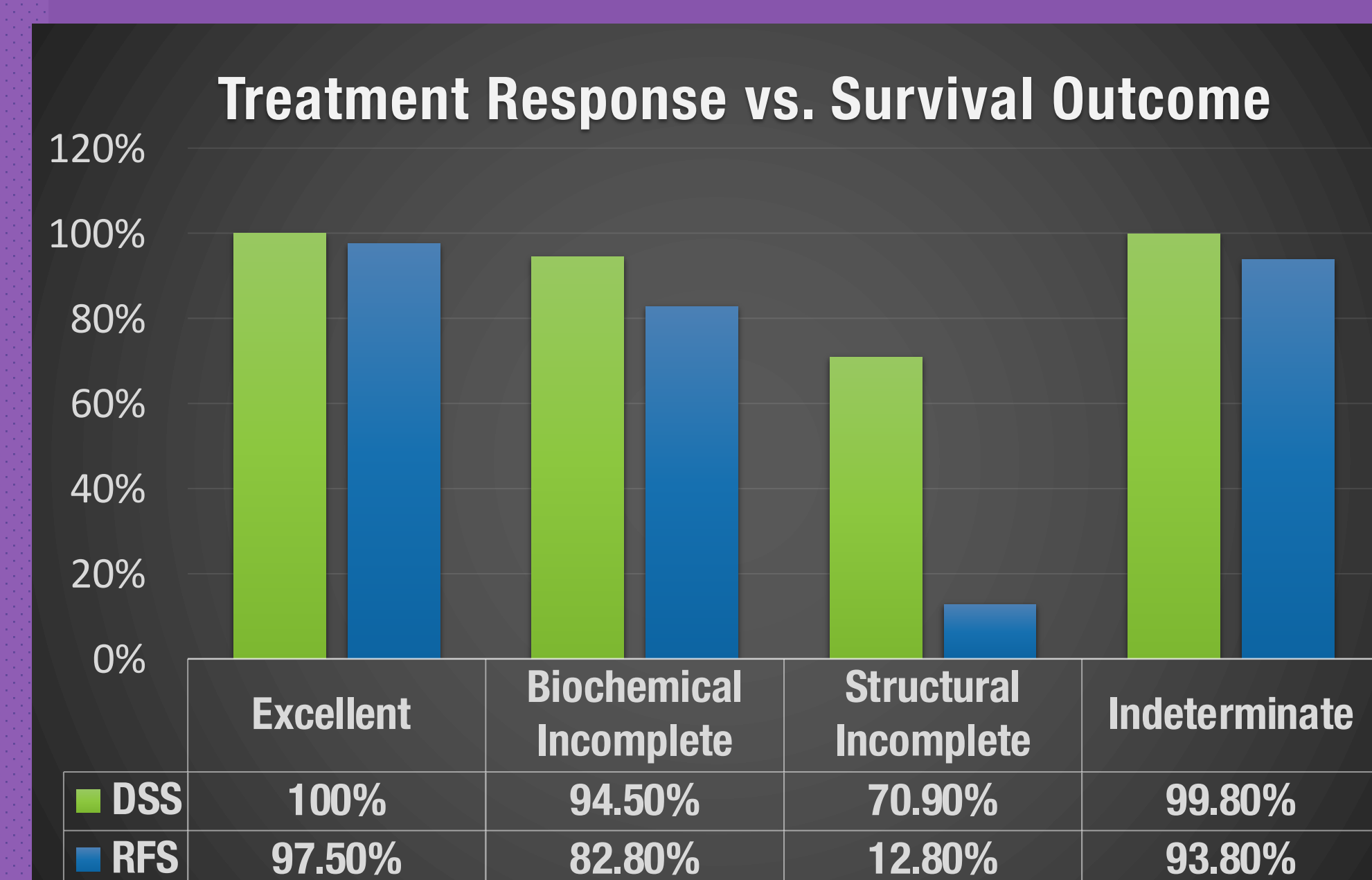
- Data source: Population-based cohort of thyroid cancer patients.
- 1664 WDTC patients of Total Thyroidectomy from a cohort of 2884 consecutive patients .
- Diagnosed during 1970-2015 in the province of Manitoba, Canada.
- Post-treatment thyroglobulin was recorded in 1178 cases.
- Median follow-up of 11.5 years.

Methods

- RFS and DSS calculated using the Kaplan Meier method and compared using Log Rank (Mantel-Cox) test.
- Multivariable analysis with Cox-proportional hazard model was used to assess the independent impact of different prognostic factors.
- Akaike information criterion (AIC), a measure of statistical model fit, was used to compare the ATA risk stratification model with the conventional clinical and radiological follow-up.
- Delta AIC, Akaike weight, and evidence ratios were calculated to compare the relative strength of these models.

Results

- Mean Age: 46.9(+/- 16.3) years, Male: Female 1:3.
- Papillary TC 1495 (89.8%), Follicular TC 106 (6.4%), Hurthle Cell TC 54 (3.2%), Poorly Differentiated TC 9 (0.6%)
- Stage I- 79.7%, Stage II- 15.6%, Stage III- 1.6% Stage IV- 3.0%.
- 561 patients (33.7%) received adjuvant radioiodine.
- DSS and RFS of the cohort were 95.3% and 86.4% at 10years, and 90.5% and 83.7% at 20 years respectively.



Factors affecting RFS (Cox Regression Model)			
Gender(Male vs Female)	HR:1.30;	95% CI=1-1.68;	p=0.04
Biochemical incomplete vs Excellent response	HR:4.70;	95% CI=1.44-15.37;	p=0.01
Structurally incomplete vs Excellent response	HR:44.4;	95% CI=14.04-140;	p<0.001
Factors affecting DSS (Cox Regression Model)			
Age at Diagnosis	HR:1.03;	95% CI=1.02-1.05;	p<0.001
Biochemical incomplete vs Excellent response	HR:2.46;	95% CI=0.30-19.65;	p<0.001
Structurally incomplete vs Excellent response	HR:3.50;	95% CI=1.12-61.42;	p<0.04

- The survival prediction models incorporating incompleteness of resection had much lower AIC both for RFS (2804.7 versus 3848.5) and DSS (937.7 versus 1102.82).
- Akaike weights indicate better risk prediction by ATA risk stratification with nearly 100% certainty than clinical or radiological findings with odds of it being an inferior predictor RFS only 1 in 4.5×10^{226} and 7.1×10^{35} for DSS.

Conclusions

- Our study proves with a very high level of certainty that the initial treatment response of WDTC by ATA risk stratification criteria correlates better with both DSS and DFS than the clinical or radiological follow-up.
- Biochemical Incomplete response is a predictor for RFS but not of DSS.
- Indeterminate response has a similar predictability to Excellent Response for RFS and DFS.