

# Preventing Unnecessary Pituitary MRIs in Hypogonadal and Infertile Men with Hyperprolactinemia: Cost Savings using a Novel Prolactin to Testosterone Ratio



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## BACKGROUND / RATIONALE

- Hyperprolactinemia is a common laboratory finding in a population of men with symptomatic hypogonadism or infertility
- If serum prolactin (PRL) is above the upper limit of normal on two laboratory analyses, current practice is further workup with a pituitary magnetic resonance imaging (pitMRI). However, this practice pattern may lead to unnecessary healthcare costs secondary to the overutilization of pitMRI.
- Recent data has suggested serum prolactin:testosterone (PRL/T) ratio may predict pitMRI findings. We sought to examine the cost savings associated with utilizing combinations of serum PRL and serum PRL/T to predict pitMRI positive findings and obviate the need for unnecessary pitMRI.

## METHODS

- A retrospective cohort study was performed on hypogonadal men <75 years old with mild hyperprolactinemia (15.1-50 ng/mL) who underwent pitMRI between 10/1999 and 03/2019 at a single tertiary care center
- Baseline clinicodemographic (symptoms, age, BMI, medications) and laboratory variables (PRL, T, LH, FSH, SCr) were collected
- Exclusion criteria included a prior pituitary adenoma or symptoms concerning for a pituitary abnormality (e.g. visual changes, galactorrhea)
- Receiver Operating Characteristics and Area Under the Curve metrics were created from fitted binomial distributions.
- A cost analysis was performed based on the institutional cost of: pitMRI, serum PRL and serum T.

## CONCLUSIONS

- The combination of serum PRL and PRL/T correctly predicts the vast majority of pituitary adenomas in patients with mild hyperprolactinemia.
- Further, this laboratory combination avoids a substantial proportion of unnecessary pitMRIs, resulting in a significant healthcare cost savings.
- Future clinical guidelines should consider incorporating a screening threshold using serum PRL and PRL/T prior to ordering pitMRI for mild hyperprolactinemia.

## RESULTS

- 141 men met inclusion criteria. Pituitary adenomas were found on pitMRI in 40 men (28.3%).
- Of the various combinations of serum PRL and PRL/T:
  - PRL/T > 0.10 had the greatest specificity
  - PRL/T > 0.08 OR PRL > 25 had the greatest sensitivity (Table 1)
- Cost savings were significant for all combinations (Table 2).

Table 1: Optimal Screening Thresholds for Identifying Pituitary Pathologies				
Cutoff	# Adenomas Correctly Captured (Sensitivity)	# Without Adenoma Avoiding MRI (Specificity)	Positive Screen	Negative Screen
PRL/T ≥ 0.10	32/40 (80%)	65/101 (64%)	68/141 (48%)	73/141 (52%)
PRL/T ≥ 0.10 or PRL ≥ 25	36/40 (90%)	48/101 (48%)	89/141 (63%)	52/141 (37%)
PRL/T ≥ 0.08 or PRL ≥ 25	39/40 (98%)	31/101 (31%)	109/141 (77%)	32/141 (23%)

Table 2: Impact of Screening Thresholds on Costs of Identifying Pituitary Pathologies						
Cutoff	Expense associated with:					
	Positive Screen	Negative Screen	Testing Cohort	Identifying Each Lesion	Missing Each Lesion	Percent Savings
PRL/T ≥ 0.10	\$161,228	\$24,747	\$185,975	\$5,812	\$18,542	44.4%
PRL/T ≥ 0.10 or PRL ≥ 25	\$211,019	\$17,628	\$228,647	\$6,351	\$26,416	31.6%
PRL/T ≥ 0.08 or PRL ≥ 25	\$258,439	\$10,848	\$269,287	\$6,905	\$65,024	19.4%