Validation and Accuracy of Synovial Alpha Defensin in a Suburban Academic Center after Implantation as Part of the Workup for Periprosthetic Joint infections

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Disclosures

- The authors have no conflicts of interest in regards to this research study

- Periprosthetic joint infections increase morbidity and mortality after hip and knee arthroplasty[1,2,3,4]
  - Revision arthroplasty and failure post revision

- Emergent problem that requires a clinical diagnosis
  - Introduction of MSIS criteria in 2011[5]

- Increasing development of biomarkers as diagnostic tests
  - Synovial fluid alpha-defensin
    - Incorporated into 2018 MSIS update[6]
- Prior literature has shown up to 100% for specificity and sensitivity[7,8,9,10]
- Synovial alpha-defensin biomarker incorporated into our practice in 2014

- The purpose of this study was to evaluate our implementation of synovial alpha-defensin (Synovasure®) with comparison to the 2011 MSIS criteria for diagnosing periprosthetic joint infections after hip and knee arthroplasty

- We hypothesized that the sensitivity and specificity of the synovial alpha-defensin immunoassay will both be 100%

Approach & Results

- Single center, retrospective chart from 2014 – 2016

- 128 consecutive that came in for evaluation of potential hip / knee periprosthetic joint infection (PJI)

- All patients must have received synovial alpha-defensin immunoassay in addition to our standard PJI workup

- Data was collected from electronic medical records after IRB approval

- Rationale - Evaluate the potential diagnostic capability of synovial-alpha defensin

Approach & Results

- 28 patients had a positive synovial alpha defensin test vs. 100 patients with a negative test
  - There were no significant differences in demographics between groups

	Positive	Negative	P-Value
Age	69.5	67.2	0.381
Sex (M/F)	18/10	48/52	0.140
Hip / Knee	10/18	52/48	0.127
Tobacco Use	4	12	0.750
Diabetes	8	23	0.619

Approach & Results

- Results of our standard PJI workup:

	Positive Synovasure [®]	Negative Synovasure [®]
CRP Serum	112.4	20.9
Synovial WBC	42,723.5	739.3
Synovial PMN	87.2%	41.2%
Positive Culture	5 (17.9%)	7 (7%)
Gram Stain	8 (28.6%)	0
Crystals	9 (32.1%)	0

Approach & Results

- In comparison to 2011 MSIS as gold standard

	Value	95% Confidence Interval
Sensitivity	95.00%	75.13 – 99.87%
Specificity	91.67%	84.77 – 96.12%
Positive Predictive Value	67.86%	52.84 – 79.91%
Negative Predictive Value	99.00%	93.61 - 99.85%
Accuracy	92.19%	86.10 – 96.19%

Conclusions

- Our results demonstrated that there is a role for synovial-alpha defensin immunoassay in PJI workup

- However there was a low positive predictive value and a failure to achieve 100% in either sensitivity or specificity
  - Therefore it cannot be used as a standalone test

- Our findings support more recent literature of incorporating biomarkers into the clinical picture
  - 2018 MSIS criteria

- Analysis of our results has kept Synovasure ® as part of our standard PJI workup

Future Directions

- Since the implementation of this study, potential sample size has grown
  - Possibility of re-evaluating with most up-to-date population
  - Possibility of utilizing the 2018 MSIS criteria for comparison

Acknowledgements

- Thank you to Drs. Kain, McAlpine, Specht and De Giacomo for bringing me onto this project in 2017
- Thank you to John Garfi for guiding the statistical analysis

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