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Serum Serotonin Compared to Plasma 5-HIAA and Chromogranin A as Biomarkers of Response to Hepatic Artery Bland Embolization

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BACKGROUND

Chromogranin A (CGA) and 5-HIAA are meaningful biomarkers in managing neuroendocrine tumors (NETs). CGA, though nonspecific, can reflect disease bulk and typically decreases after debulking surgery. 5-HIAA is specific to NETs though its measurement may require a special diet, a 24-hour urine collection, or specialized blood collection tubes; but usually decreases after debulking procedures. Serotonin, though useful in diagnosing NETs, is not followed as a biomarker of response as assays before 1995 also measured serotonin release from platelets during blood collection/storage, resulting in wide fluctuations. Serotonin assays now are no longer affected by platelet serotonin release. We hypothesize that by using the current serotonin assay, serial serotonin measurements could predict response similar to CGA and 5-HIAA.

METHODS

A retrospective review of clinical, laboratory and radiographic data was performed for all sequential patients who underwent hepatic bland embolization (HAE) from Sept 2016 to Sept 2021 at the University of Kentucky Markey Cancer Center. Inclusion criteria included those patients who had elevated serum serotonin, plasma 5-HIAA, and CGA measurements prior to and post-HAE with concordant changes to the embolization. Percent change in laboratory measurements before and after an HAE treatment was calculated. Measurements closest to procedure dates were used to calculate percent changes. Correlations between percent changes in laboratory measurements were analyzed using Spearman's rank test. Statistical graphs were used to evaluate the hypothesized correlations.

RESULTS

Fifty-one well-differentiated NET patients underwent 96 HAEs with 23 patients having 28 procedures meeting the inclusion criteria. Nineteen pre-post procedures were included in the serum serotonin and plasma 5-HIAA analysis. Twenty-two pre-post procedures were included in the serum serotonin and CGA analysis. The observed Spearman's correlation between serum serotonin and plasma 5-HIAA is $r_{s/H} = 0.72$, p (2-tailed) < 0.001 (n=19); and $r_{s/C} = 0.61$, p (2-tailed) = 0.002 (n=22) for the correlation between serum serotonin and CGA.

CONCLUSIONS

Changes in serum serotonin significantly correlated to changes in plasma 5-HIAA and CGA. Serum serotonin may be a useful biomarker for monitoring the response to therapy. The addition of serum serotonin measurement to future clinical trials as an exploratory biomarker seems warranted.

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