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DYNAMIC CONTOUR TONOMETRY. A COMPARATIVE STUDY ON HUMAN CADAVER EYES

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Objectives: To compare intraocular pressure (IOP) measurements obtained by a new tonometer, the Dynamic Contour Tonometer (DCT), Goldmann Applanation Tonometer (GAT), pneumotonometry (PTG) and intracameral manometer in human cadaver eyes.

Design: Prospective comparative instrument validation study

Materials: Human eye bank eyes

Main Outcome Measurement: Comparisons among DCT; GAT; PTG; and manometric IOPs

Methods: 16 freshly enucleated human cadaver eyes were de-epithelialized and dehydrated with Dextran 20% solution until a relatively stable central corneal thickness (CCT) was achieved. A tube was placed in the anterior chamber and connected to a transducer and to a bottle system filled with balanced salt solution. The pressure in the eye was then altered between 5 mmHg and 58 mmHg by changing the height of the bottle. IOP measurements were obtained with DCT, GAT, and PTG at each manometric pressure reading. DCT was recently introduced by Kanngiesser and Robert and is hypothesized to be independent of CCT and to measure IOP more accurately than other types of external tonometry based on applanation and indentation.

Results: On average, DCT measured 0.58±0.7mmHg higher than real intracameral pressure. GAT and PGT showed consistently lower values -4.01±1.76mmHg and -5.09±2.61mmHg respectively. In the clinically significant pressure range of 8 through 24mmHg, DCT showed an average of +0.33±0.49mmHg, GAT -3.43±1.24mmHg and PTG -2.97±1.82mmHg compared to manometric IOP.

Conclusions: The results of this study show that DCT does indicate IOP that is significantly closer to the true manometric levels than either GAT or PTG (P-values < 0.001 throughout all bottle heights). Further in vivo studies are warranted to determine its dependence on corneal thickness and its reliability on patients.