METHOD OF SIZE MEASUREMENT IN MONO-VISION SCOPE IMAGES

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Technology description

Unmet Need

Kidney stone disease affects up to 1 in 8 people (12%) worldwide and is commonly treated by a procedure known as flexible ureteroscopy (URS). During URS, kidney stones are fragmented and extracted through the ureter. URS involves significant intra-operative decision making since surgeons must accurately assess the size of the stone fragments to make key judgements about when to remove the fragments and if they can safely pass through the patients ureter. Urologists typically rely on visual estimation of fragment dimensions via subjective comparison to known landmarks or implements, but this is an unreliable method, especially for surgeons with less experience performing URS. Furthermore, current mono-vision scope systems cannot measure objects in the image because they fail to account for the distance of the target relative to the lens. Misjudging stone fragment size can create complications including discontinuous stone fragmentation, ureteral trauma, or entrapped baskets, contributing to an intra-operative complication rate of 4.2%. The additional time surgeons spend gauging stone size also increases treatment time and decreases surgeon productivity. Thus, there is a need for an accurately measument instrument of stone dimensions during URS. Moreover, the problem extrapolates to all types of mono-vision scopes including laparoscopes.

Technology Overview

A wire that is commonly used in USR is passed through the working channel of the ureteroscope as usual, but in addition to its common clinical function is also used to track the distance to the object to be measured. Video capture and wire depth information from the ureteroscope is processed by a novel software, which performs real-time depth calculations and determines the scale of objects during URS. Surgeons can select the boundaries of the stone fragments to view dimensions during extraction. In addition, the dmensional scale is supperimposed over the real-rime image from the scope, as shown in the figure.

Advantages

it enables real-time, intra-operative measurement of fragment dimensions whereas current techniques only allow for post-operative measurements. Also, the software can efficiently provide surgeons with accurate quantifications of fragment sizes to within 0.2mm, enabling them to quickly make informed

intra-operative decisions instead of relying on subjective estimation. The technology is also easy to integrate with current mono-vision scopes, eliminating the need for hospitals to purchase costly new stereoscopic imaging equipment.

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