CHEMICAL COMPOSITION OF ENCRUSTATATES ON DOUBLE ”J“ URETRAL STENTS IN RECURRENT UROLITHIASIS

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Background

Double J uretral stent is a thin rubber, plastic or silicone catheter that is placed between the renal pelvis and urinary bladder with a view to facilitating the flow of urine. It is used at kindey obstruction and ureter area with kidney stones or its fragments moving into the ureter, either spontaneously, or occasionally following treatment, such as shock wave lithotripsy.

The stent can stay in place for few weeks to 3 months or more depending on the indication. If left for more than 6-9 months some stents may get encrusted leading to stone formation around the stent.

The aim of this study was to investigate the chemical composition of extracted encrustates from the stents and to compare them with chemical composition of previously excreted kidney stones for some patients with recurrent urolithiasis.

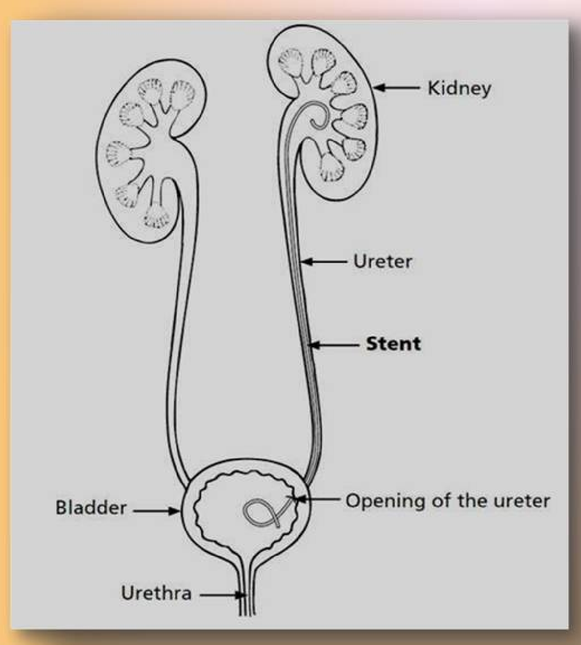

Figure 1. Double J uretral stent

Methods. We analyzed the composition of encrustates to double J stents in 20 patients with recurrent urolithiasis. Analysis of the composition of kidney were made by thermogravimetric analysis (Mettler TG 50) and FT-IR (Fourier transform infrared) spectroscopy (Shimadzu 8400).

Results. The results obtained encrustates composition were compared with the composition of primary kidney stones by patients previously excreted. Encrustates samples were taken from three different places on the stent to determine sample homogeneity considering the diversity of environments through which the stent is situated. The results indicate the diversity of the composition of the sample encrustates with the same stent.

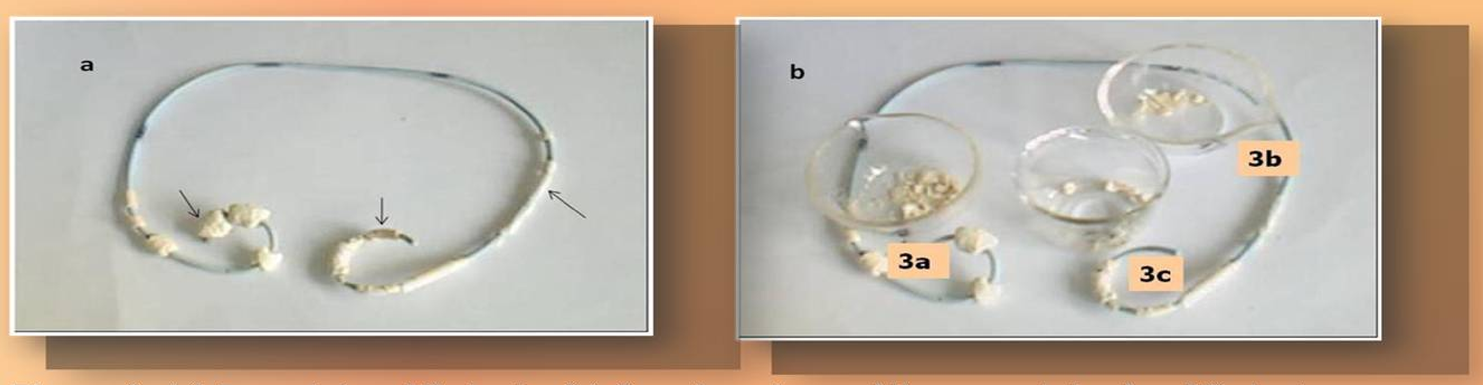

Figure 2. (a) Encrustates „JJ“ stents; (b) Sampling places of the encrustates for „JJ“ stents

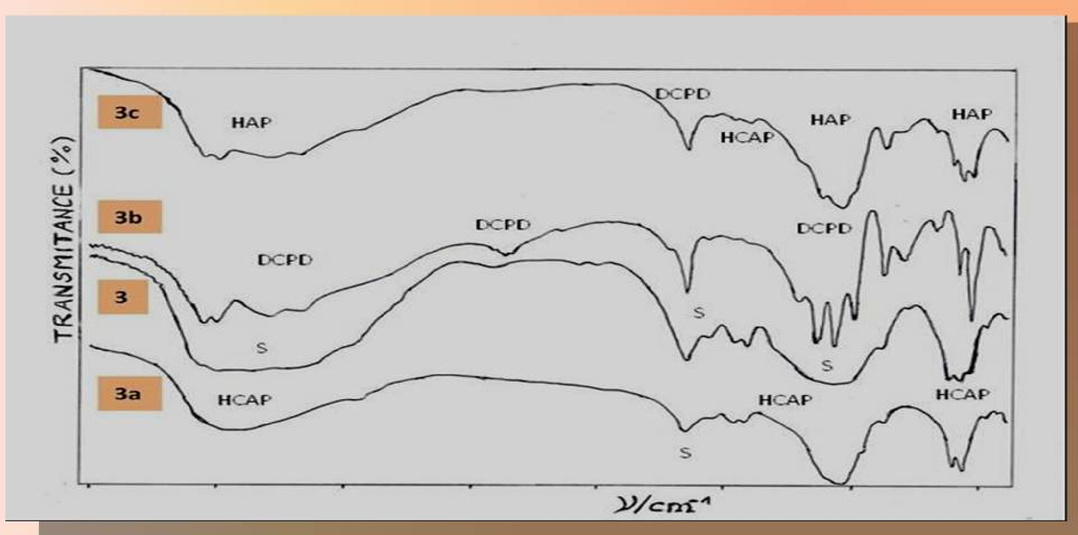

Figure 3. FT-IR spectra of the samples encrustates exstracted to the „JJ“ stent

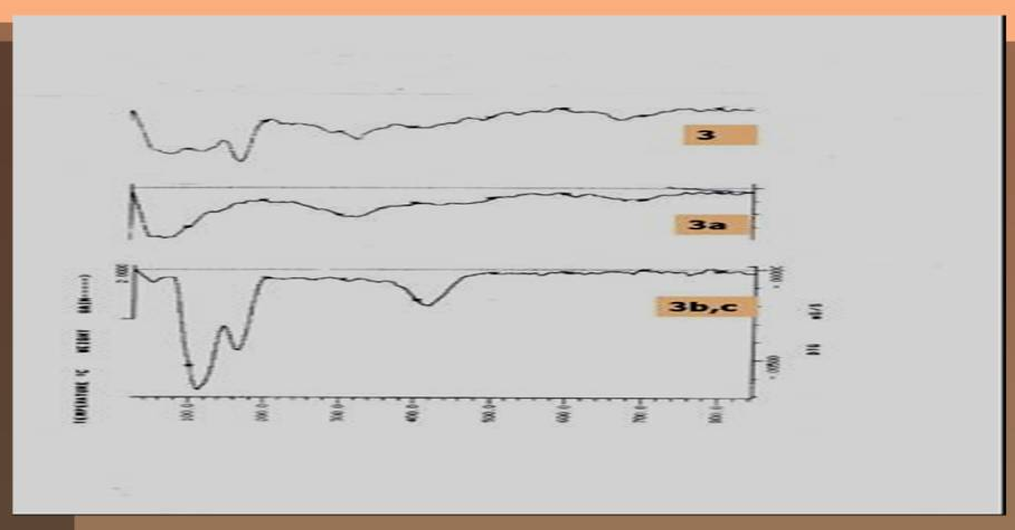

Figure 4. Thermograms of the samples encrustates exstracted to the „JJ“ stent

(**DCPD**-calcium hydrogen phosphate dihydrate-brushite, **HCAP**-hydroxycarbonate apatite, **HAP**-hydroxyapatite, **S**-magnesium ammonium phosphate hexahydrate-struvite)

FT-IR spectroscopic analysis of the results obtained are shown in Figure 3 that shows four spectrum. FT-IR spectra of 3a-c, which correspond to samples taken for analysis as shown in Figure 2. It is interesting that 3.a-c FT-IR spectra, Figure 3. sampled at the same stent does not provide unambiguous data for the composition of the sample. In Figure 4. presents the results of thermogravimetric analysis of extracted encrustates which confirmed the results of FT-IR analysis.

FT-IR spectroscopy and thermogravimetric analysis of encrustations on JJ stent in stone formers mainly revealed calcium phosphate and magnesium ammonium phosphate-struvite, while analysis of their primary kidney stones mainly revealed calcium oxalate.

Conclusions. Preliminary results in this study indicate that analysis of the composition encrustates deposited at the stent in a few patients were not uniform nor entirely the same composition as the primary kidney stones.

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