

# **Evaluating ESWL-Induced Renal and Ureter Urothelial Injury Based on Urine Cytology**

## **Students:**

Fatima Helo  
Laila Qarawi

## **Supervisor :**

Dr. Mahmoud Mustafa  
Dr. Hanood Abu Ras

## **Abstract :**

### **Background:**

Extracorporeal shock wave lithotripsy (ESWL) is a non-invasive treatment of kidney stones uses sound - shock waves to break stones into small fragments that can pass spontaneously. Here in we will evaluate the possible harmful effect of electromagnetic and electrohydraulic ESWL on the urothelial and muscle layer of kidney and ureter.

### **Methods:**

Total of 50 patients 29(58%) male and 21(42%) female, with mean age of (51.02+SD) who underwent ESWL application in Tubas state hospital and Al-Rahma dispensary between July 2015 and November 2015 were included. Thirty three (66%) patients of them had renal stone and 17(34%) of them with ureter stone. In Tubas state hospital ESWL device type was electromagnetic while in the other one was electrohydraulic. Urinary cytological examinations were done for all patients immediately before and after ESWL therapy and 10 days later. The average numbers of epithelial cells, red blood cells and myocyte were counted under 40 X magnification. Any patient with history of renal or ureter surgery, patient with a stenting and patient with previous application of ESWL was excluded.

### **Results:**

There was significant difference in the number of epithelial cell before and post immediate application of ESWL: 1.66 and 14.9 cell/field, respectively ( $p=0.001$ ). Similarly there was significant difference in number of RBC before and post immediate ESWL : 5.44 and 113.45 cell/field, respectively ( $p=0.001$ ). There was significant difference between patients with renal or ureter stones in term of numbers of RBC and epithelial cell in the post immediate ESWL: 150,42.58 cell/field, respectively ( $p= 0.001$ ), and 18.72, 6.59 cell/field, respectively ( $p=0.001$ ). The number of RBC was significantly higher in patient underwent stone fragmentation using electromagnetic ESWL device than those who used electro hydraulic ESWL device :141.9, 93.4 cell/field, respectively ( $p=0.022$ ). No myocyte and no basement membrane elements detected in any of the cytological examinations. The controlled cytological examinations which were done after 10 days of ESWL therapy revealed recovery of all cytological findings with abnormalities and the findings became similar to that of pre-SWL cytological examination.

### **Conclusions:**

ESWL-induced urinary urothelial lesion is limited to the mucosal layer and there is no evidence of damage to the basal membrane or deeper muscle layer. The acute increments in the number of

epithelial cells and red blood cells after ESWL therapy were statistically significant. This effect was not permanent and it was resolved within short period .Electromagnetic ESWL device cause high number of RBC than electrohydraulic device on the post immediate urine cytological examination, this arise the question about the possibility of more mucosal harmful effect on kidney and ureter in patient using electromagnetic device .