Carbon footprint in flexible ureteroscopy: a comparative study on the environmental impact of reusable and single-use ureteroscopes


Analysis undertaken of typical life cycle and carbon footprint

- Single-use LithoVue™ flexible ureteroscope
- Reusable Olympus Flexible Video Ureteroscope (URV-F)

<table>
<thead>
<tr>
<th>Carbon footprint for single-use LithoVue (kg of CO₂ per case)</th>
<th>Carbon footprint for reusable URV-F* (kg of CO₂ per case)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>3.83 kg</td>
</tr>
<tr>
<td>Sterilisation</td>
<td>0.3 kg</td>
</tr>
<tr>
<td>Solid waste</td>
<td>0.3 kg</td>
</tr>
<tr>
<td>Repair</td>
<td>0.45 kg</td>
</tr>
</tbody>
</table>

**SINGLE USE**
TOTAL
4.43 kg of CO₂ per endourologic case

**REUSABLE**
TOTAL
4.47 kg of CO₂ per endourologic case

The environmental impacts of the reusable flexible ureteroscope and the single-use flexible ureteroscope are comparable
Study overview – Davis et al, 2018

Authors: Davis NF, McGrath S, Quinlan M, Jack G, Lawrentschuk N, Bolton DM.


Study objectives: To compare the environmental impact of single-use flexible ureteroscopes (LithoVue™; Boston Scientific) with reusable flexible ureteroscopes (Olympus Flexible Video Ureteroscope; URV-F).

Methods:
• Analysis undertaken of the typical life cycle of the LithoVue single-use digital flexible ureteroscope and the reusable URV-F
• To assess carbon footprint, data obtained on:
  ■ Manufacturing: of both single-use and reusable flexible ureteroscopes
  ■ Typical uses of a reusable scope, including repairs and replacement instruments
  ■ Disposal of both types of ureteroscopes
• Carbon footprint calculated using standardised protocol guidelines:
  ■ For single-use and reusable flexible ureteroscopes: mass of CO₂/kg emitted during the manufacturing process was determined
  ■ For reusable flexible ureteroscopes: carbon footprint (kg of CO₂ per case) of was calculated using validated models

Key results:
• The reusable URV-F flexible ureteroscope and the LithoVue single-use flexible ureteroscope showed comparable environmental impacts.
• The total carbon footprint of the lifecycle of each device evaluated was <5 kg of CO₂ per case, which compares favourably with other medical equipment and surgical procedures.
• Research in the field of urology should focus on strategies to reduce the environmental effects of CO₂ emissions that occur during the course of patient treatment.