Cordless Ultrasonic Energy Devices as an Environmentally Green Alternative to Traditional Corded Ultrasonic Devices Provide Excellent Hemostasis and Operative Dissection in Common General Surgical Procedures

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INTRODUCTION

Utilization of environmentally friendly "green" devices can have a role in decreasing operating room waste while maintaining clinical outcomes and avoiding complications. We evaluated operative outcomes and medical waste generated with respect to a variety of outpatient general surgical procedures while using a cordless battery powered energy device (sonicision 7, Medtronic).

DEFINING MEDICAL WASTE

Medical Waste can be generated through the casual use of disposable instruments. A significant amount of medical waste is generated during common surgical procedures. Laparoscopic clip appliers and staplers are commonly used devices that generate medical waste that often end up in landfill or are disposed of in ways that do not result in recycling of the device.

Laparoscopic appendectomy and cholecystectomy are two high volume operations where disposable clip appliers and laparoscopic staplers can be eliminated with the use of ultrasonic dissection.

OPERATIVE TECHNIQUE LAPAROSCOPIC APPENDECTOMY

Laparoscopic cordless ultrasonic shears (Sonicision 7, Medtronic) was used to complete dissection and transection of the appendiceal artery and delineation of the base of the appendix. Transection of the appendix was accomplished using endo-loop suture ligatures followed by transection of the appendix. Stapler use was decreased and disposable clip appliers were not used.

OPERATIVE TECHNIQUE LAPAROSCOPIC CHOLECYSTECTOMY

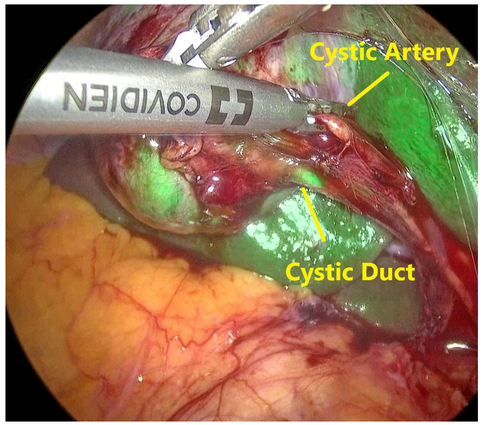
Transection of the cystic duct was accomplished by dividing between locking clips (Teleflex) placed via a reusable, single use clip applier. The cystic artery was transected using a cordless ultrasonic shear (Sonicision 7, Medtronic). Disposable multi-fire clip appliers were not used

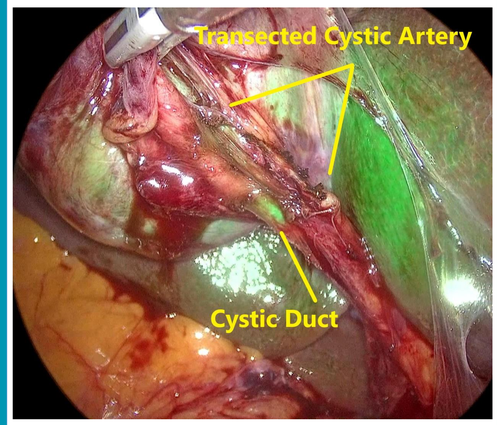
METHODOLOGY

76 outpatient procedures were evaluated in a retrospective review of cases where a cordless energy device was utilized.

From August 2022 through September2023, 17 laparoscopic appendectomies, 49 laparoscopic cholecystectomies, 3 hiatal hernias and 6 bariatric operations were reviewed for bleeding complications related to preferential utilization of a cordless energy device as an alternative to utilization of hemostatic clips or staplers to ligate vessels during the course of the operations.

In each case the appendiceal artery, the cystic artery, or short gastric vessels were ligated using the cordless energy device. Each patient was observed for an overnight stay prior to discharge and each patient was monitored for bleeding complications prior to discharge. Preoperative hemoglobin postoperative hemoglobin, vital signs and clinical progress was assessed.

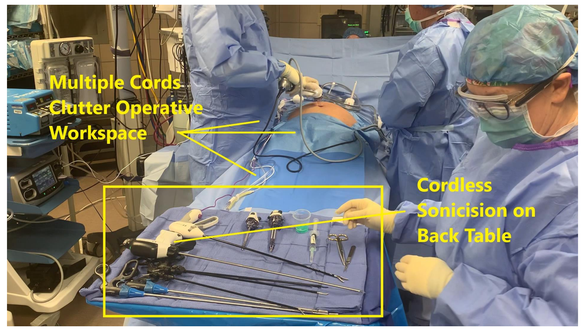




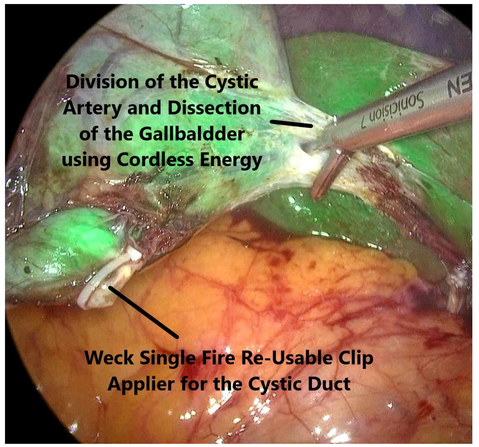
RESULTS

Stapler usage was decreased by 80% in the laparoscopic appendectomy operations, Utilization of disposable cystic duct clip appliers was decreased 55% in laparoscopic cholecystectomy. There was no utilization of any disposable clip appliers in any of the bariatric or hiatal hernia cases utilizing cordless energy devices.. No hemostatic clips were used to ligate any vessels in the 76 cases reviewed.

The average preoperative hemoglobin was 12.54 and the average hemoglobin on postoperative day one was 11.8. There were no intraoperative or postoperative bleeding complications There were no reoperations or re admissions and all patients discharged successfully on post operative day one.



Cordless energy devices avoid operative field clutter



Cordless Ultrasonic Energy was used to divide the Cystic Artery
Cordless Ultrasonic Energy was used to dissect the Gallbladder
Single Fire Reusable Clip Appliers were used to ligate the Cystic Duct

CONCLUSIONS

Utilization of cordless ultrasonic energy devices assisted in reducing medical waste in these 76 cases. Each device uses long lasting batteries and small reusable generators that are recycled at the end of life. There are no cords that are required and the instrument itself has a small amount of medical waste that can be recycled. Clinical outcomes in this series of 76 patients had no episodes of intraoperative bleeding requiring utilization of disposable clips or alternative instruments and no postoperative complications. Utilization of disposable clip appliers and disposable staplers was decreased in this group further decreasing medical waste associated with these operations