Radiofrequency Surgery Spares Tissue and Improves Operation Comfort in Skin Surgery

Robert Kasten

Fast wound healing and good cosmetic results are of great importance in skin surgery. Radiofrequency surgery causes less lateral tissue damage than conventional electrosurgery. Consequently faster wound healing and a better cosmetic outcome can be expected. Studies have even shown better cosmetic results for radiofrequency skin surgery than for CO2 laser applications. Radiofrequency also improves operation comfort by enabling germ-free and pressure-free cuts with minimal bleeding in a very cost effective way. We present a short review of the literature and our own histopathological findings.

Fig. 1: ARROW*tip*™ monopolar microdissection electrode, single-use (REF 36 44 21)

Fig. 4: CURIS® 4 MHz radiofrequency generator

Introduction: Radiofrequency (4 MHz)surgery is an established procedure in skin surgery that allows the cutting of tissue with minimal bleeding and the least thermal damage. Besides a dry surgical field, another advantage of the RF cut over "cold steel" cuts is the freedom of movement that can be achieved with a small needle or blade electrode [1].

Histopathology: In an exemplary case of neurofibromatosis type I, we had specimens examined histopathologically. We excised the tumor under local anesthesia with a short-angled ARROWtip™ monopolar microdissection electrode, single-use (REF 36 44 21, Sutter) attached to a CURIS® 4 MHz radiofrequency generator (Sutter). The neurofibroma was excised to the subcutaneous plane with the CURIS® set to 7 watts in a pure cutting mode (CUT 1). The defect was closed with absorbable, subcutaneous sutures and cutaneous interrupted sutures. The non-absorbable suture material was removed on the seventh day postoperatively.

Results: Wound healing was uneventful. Histologic examination showed a lateral thermal damage of 150 micrometer caused by the CURIS® 4 MHz radiofrequeny generator (Fig. 2).
The depth of the incised skin measured over 1.7 mm. On the same specimen a cut was made with a conventional electrosurgical unit (Berchtold Elektrotom 400), operating at 500 kHz, using the same electrode at comparable power. Histopathology showed a necrosis of approx. 286 µ – almost twice the thermal damage that occurred during the use of the CURIS® 4 MHz radiofrequeny generator (Fig. 3).

Discussion: In a study on excisions of thin upper eyelid skin, radiofrequency was superior to the CO2 laser method [1]. For incisions in thicker facial skin such as the forehead, higher power settings are required that will increase lateral thermal damage as a result. Nevertheless, surgery with the CURIS® 4 MHz radiofrequeny generator yielded good cosmetic results.
Conventional electrocautery machines work at frequencies between 350 and 500 kHz and cause greater lateral thermal damage than the CURIS® that cuts with a tissuegentle power output of 4 MHz. Bridenstine[2] even speaks of a thermal damage margin of 75 µm when using radiofrequency for skin cuts, but fails to indicate the depth of the skin incision. Pollack[3] reports faster initial reepithelialization with cold steel cuts, but also shows similar results at the end of the healing period. Hambley[4] established that even conventional electrosurgery creates less epidermal destruction than the CO_2 laser. Our findings and those of others[5] show the RF cut to be superior to cuts with conventional electrosurgery, which operates at lower frequencies.

Conclusion: Radiofrequency surgery is an important tool for skin surgeons. It is an innovative method that allows the excision of benign tumors, even in the deeper layers of the skin, with good cosmetic results. Radiofrequency offers the advantages of germ-free and pressure-free cuts with minimal bleeding in a very cost effective way. Radiofrequency certainly enriches our surgical armamentarium.

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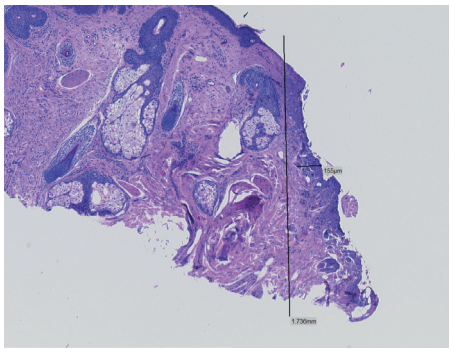

Fig. 2: Lateral thermal damage during radiofrequency excision: 155µm.

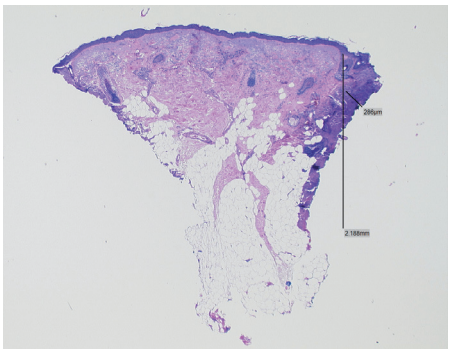

Fig. 3: Lateral thermal damage during conventional electrosurgery excision: 286µm.

Featured Products

single-use

ARROW*tip*™ monopolar microdissection electrode

Qty	REF	Description
10	**36 44 21**	**ARROW*tip*™** monopolar microdissection electrode, single-use 45° angled downw., total length: 53 mm

Optional: reusable **ARROWtip™** monopolar microdissection electrode (REF 36 03 21)

CURIS® 4 MHz radiofrequency generator
Basic equipment

Description		
1	**36 01 00-01**	CURIS® 4 MHz radiofrequency generator (incl. mains cord, user's manual and test protocol)
1	**36 01 10**	Foot switch two pedals for CURIS® (cut & coag), 4 m cable
1	**37 01 54 L**	Bipolar cable for CURIS®, length: 3 m
1	**36 07 04**	Monopolar handpiece (pencil) cut & coag, shaft 2.4 mm, cable 3 m
1	**36 02 38**	Cable for single-use patient plates, length: 3 m
available patient plates:		
1 (x100)	**29 00-5**	Single-use patient plate, split, for adults and children, PU 20 x 5 pcs.
1 (x50)	**95 80 04**	Single-use patient plate, split, for adults, PU 10 x 5 pcs.
1 (x50)	**95 80 05**	Single-use patient plate, split, for children, PU 10 x 5 pcs.
1	**36 02 26**	Re-usable rubber patient plate

Unit settings / Other accessories*

CURIS®
4 MHz radiofrequency generator

ARROW*tip*™ monop. microdissection electrode: CUT1
Power adjustment: 7 to 15 watts

Valid for the CURIS® with the orange label.

CURIS®
4 MHz radiofrequency generator

ARROW*tip*™ monop. microdissection electrode: CUT1
Power adjustment: 20 to 40 watts

* Please consider that this information is not meant to serve as a detailed treatment guide. Always adjust according to patient and application.

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Lengths for orientation purposes; may vary slightly.

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