Efficacy of Repeated Radiofrequency Ablation for Cervical and Lumbosacral Facet Pain

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Introduction

Lower back pain and neck pain are two common sources of musculoskeletal pain that without proper treatment, can significantly interfere with daily activities and quality of life of individuals.[1] It is estimated that up to 84 percent of adults have low back pain at some time in their lives, with 25% of adults reporting low back pain in the last three months.[2-4] Additionally, neck pain can often share similar pathology as low back pain, resulting in daily living detriments that can be treated with the same treatment options. Some studies suggest estimated 1 year incidence of neck pain is between 10.4% and 21.3%,[5] with an annual prevalence rate exceeding 30% among adults in the United States.[6] Conservative treatment options include physical therapy, non-opioid pain medications, and corticosteroid injections, with Radiofrequency Ablation (RFA) being conserved for refractory facet-related back pain. Patients with 3 months of chronic back/neck pain who failed conservative measures can be considered for RFA.

Pain relief after local anesthetic nerve block is diagnostic of facet joint pain, usually being demonstrated through blockade of the medial branches of the posterior rami of the spinal nerves. This diagnostic medial branch block (MBB) is typically performed for initial trial in pain relief.[7-9] In previous studies, many physicians classified at least 50% relief of target pain after MBB to be clinically significant and indicative of facet-related pain.[10]

There is established data suggesting RFA of the medial branch of the posterior rami nerve is the treatment of choice for both cervical and lumbosacral facet-related pain.[11-14] Although most patients experience clinically significant pain reduction, these benefits can decrease with time. Patients typically obtain pain relief from 6 to 12 months, with some patients reporting pain relief for up 2 years post RFA.[15] This dissipation of benefits is largely due to peripheral nerve regeneration, with the average regeneration rate being 1mm of regrowth per day.[16] Consequently, pain symptoms often return prompting repeat RFA procedure. Data for effectiveness of repeat RFA after a couple of years is scarce. Therefore, we analyzed pain reduction and duration of relief of repeat RFAs in a group of patients with cervical, lumbosacral or sacroiliac facet-related pain.

Methods

We used an electronic medical record database to identify all patients under the care of one group of physicians in the pain section of the Veterans Affairs (VA) medical center in New Orleans who received their last repeat RFA between 2018 to 2021. We reviewed records to register patients that had an initial successful RFA, but also who had at least one repeat RFA in the same area. All candidates for MBB had a diagnosis of chronic spine pain for more than 3 months. All patients were initially treated with conservative measures.

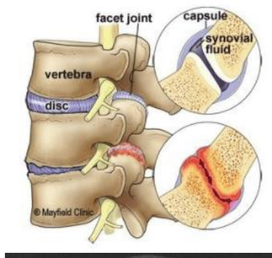
The site of the MBB was based on clinical suspicion from location of pain, established referral patterns for each facet joint, and tenderness on palpation on physical examination. The responses of each RFA were taken retroactively via phone survey that accounted for pain duration of relief of each RFA procedure, percent of pain reduction, and assessment of repeat RFAs having similar effectiveness as initial RFAs. The two criteria of a successful RFA were: (1) at least 50% relief of target pain, and (2) satisfaction with results of a prior RFA with subsequent patient desire for repeat RFA after benefits dissipated. Repeat RFAs were performed on the same vertebrae segments using the same techniques as the prior procedure. Patients who had <50% relief were considered treatment "failures".

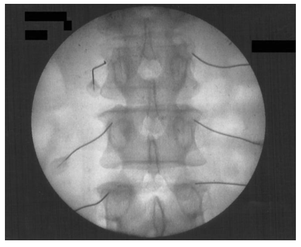
Patient responses to each repeat RFA was compared to initial successful RFA to access whether the effectiveness of repeat RFA provided similar pain reduction scores. Average duration of relief for both initial RFA and all consecutive repeat RFAs were compared as well. Duration of relief was recorded in monthly intervals by either 1-6, 7-12, or 13 to 18 months. Patients with continuing relief from their most recent RFA were not utilized in recording duration of relief.

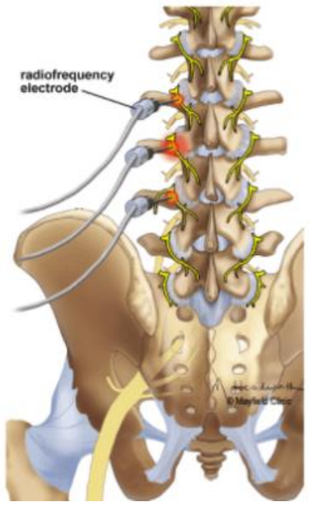
Results

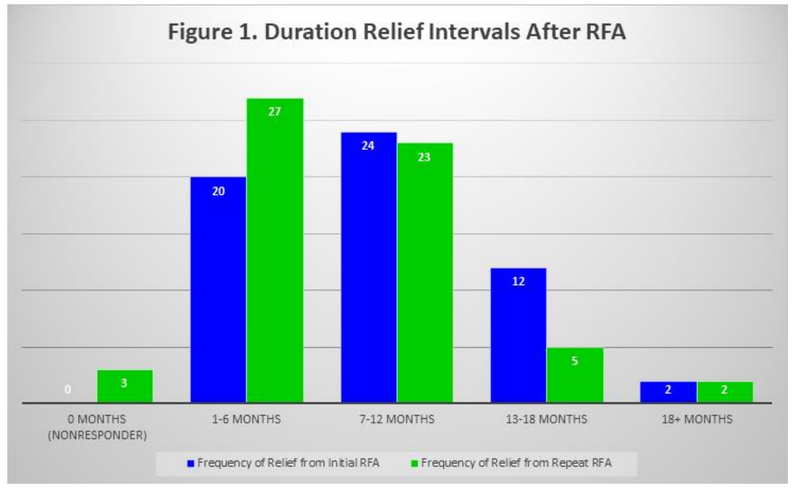
There were 61 patients that were included in the study, 6 females and 55 males. Mean age range 61 years (range 38 to 81 years). There were 61 patients included in study who had more than 1 RFA at the same location of initial procedure.

There were 170 repeat RFAs performed with 128 successes (75%) and 42 failures (25%) (see table 1). The mean duration of relief for the repeat RFA was 8 months, with the mean of 10 months after the initial RFA. A Wilcoxon Signed Rank Test showed a significant difference between the duration of pain relief in months between the initial RFA (M=10.11) and the average repeat RFA (M=7.63), (W= 47, p=0.03). There was a wide distribution of the duration of relief (Figure 1). In 3 patients there were no response to repeat RFA, which were considered failures. In twenty-seven patients, RFA provided 1-6 months relief, in twenty-three 7-12 months, in five 13-18 months, and in two patients over 18 months.









Discussion

RFA of the medial branch of the posterior rami can produce clinically significant relief of cervical or lumbosacral/SI joint-related pain.[11-14] The effectiveness of repeat RFA procedures is important to observe due the nature of facet-related pathology. In this context, we observed after an initial successful cervical or lumbosacral RFA, repeat RFAs were successful 75% of the time. RFAs were successful in all repeats in 60% of patients, with 40% having at least one failure noted. The mean duration of relief for repeat RFA was observed as 8 months, with some individuals describing no pain relief and others describing relief for up to 3 years.

There were 42 failures in the present study (25%). Barnsley[13] reported a failure rate of 20% of 45 assessable procedures. There are several possible explanations why repeat RFAs can fail after a successful initial procedure. Other causes of treatment failure include technical failure.

We used 3 criteria for this study: Reduction in target pain with initial successful RFA, return of pain, and sufficient patient satisfaction inferred from desire to have repeat RFA once benefits subside. We chose at least 50% or higher reduction of pain because this extent of pain relief has been shown to correlate with high patient satisfaction rates.[18] We did not address outcomes of initial RFA, even if pain reduction was less than 50%, because this study was focused on the ability of repeat RFAs to reproduce similar effects as initial. As stated above, we did not address failure rates of initial RFA. Rather, we focused on "patient satisfaction", defined as any patient who sought repeat RFA after an initial.

There are limitations to this study. We did not quantify changes in pain based on analog visual pain scales, nor did we note changes in activities of daily living (ADL). Rather, we relied on patient satisfaction as described by any patient who desired a repeat RFA after the initial RFA. Additional potential limitations to be considered include recall bias. Due to quantity of repeat RFAs and length of time since specific RFAs were completed, some patients showed hesitancy in confidently recalling specifically which RFA were treatment failures versus successes.

The present study also had its strengths. All patients received their initial and repeat RFAs at a set facility with the same physicians. The records of all patients who had RFAs were easily identifiable by computer inquiry. All records were readily available. All RFAs were performed by 1 or 2 experienced pain management clinicians using establishing techniques and the same equipment.

Table 1: Summary of Data

# of RFAs	1	2	3	4	5	6	7	8
# Of patients	61	61	45	27	17	12	8	4
# Of successes	55	50	36	18	12	8	4	4
# of successes in whom duration of relief is known*	55	47	35	18	12	8	4	4
No. Of successes in whom relief is ongoing	0	3	1	0	0	0	0	0

*One patient duration was excluded due to inability to recall

Conclusions

Our data demonstrates that while RFA is an effective means of pain management for patients with facet-related cervical, lumbar, or sacroiliac joint arthropathy, relief from repeat RFA was less effective in reproducing the same success rates and duration of relief as initial trials.