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Minimally invasive treatment of pilonidal sinus using the new Infinite Ring Fiber. A case series

AIM: In this study, we present a small series of patients with pilonidal cyst, which were treated with NeoV1470 Laser System using Infinite Ring Fiber 600 microns (Mm) (NeoLaser, Caesarea, Israel) (Infinite Ring Fiber - IRF). This fiber is characterized by circular 360-degree heat release, an active 4 mm tip with 1470nm emission and up to now it has been used only for vessel surgery. We are investigating its use in the treatment of pilonidal cyst.

MATERIAL AND METHODS: It is a case series study (December 2020 – December 2021) consisting of 13 patients. The choice criterion for the study was that the patient should have at least one fistula opening with maximum size of orifice < 5mm. All patients were treated as day clinic. Surgery was performed with intravenous sedation and local anesthesia using lidocaine. The pulse regime we use was (8w, 3sec, 24 J/per pulse).

RESULTS: All the patients had successful treatment. None of the patients treated with the particular fiber had any complications or relapsed disease during the follow up period.

DISCUSSION: In the international literature have been described various therapeutic options of pilonidal cyst therapy. The use of use of IRF is another one.

CONCLUSIONS: The use of NeoV1470 laser system with IRF at pilonidal cyst therapy appears to be a safe and effective option, with less pain and necrotic detriments.

KEY WORDS: Infinite ring fiber, Laser, Pilonidal sinus,

Introduction

Treating pilonidal sinus remains a challenge for contemporary surgeons even in our days, with no gold standard of treatment available¹. Having no substantive and adequate understanding of the causing mechanism, its definite treatment could be challenging even though it

is evident that the causes of such pathogenesis is multi-factorial. More specifically, three conditions must be met in order for a pilonidal sinus to be created: A) the existence of the material that penetrates the skin (hairs in the case of pilonidal sinus), B) the application of an external factor that will make the material penetrate the skin (for example application of mechanical pressure topically) and C) susceptibility of the skin in the specified area. Taking these three factors into consideration, not only was its relapse regarded to be prevented post-operatively, but also its occurrence².

It is not so rare a condition since its frequency of occurrence is approximately 26 cases over 100,000 people. It mainly concerns younger ages with an average occurrence over 21 years for men and 19 years for women, while it is 2.2 times more frequent for men³. The occurrence of a relapse is frequent regardless of the approach applied and it is globally estimated to be 10 to 30% as recorded in the international bibliography⁴.

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The past years the use of the laser is being applied by most surgeons in treating not only the emerging condition, but also its relapse effectively⁵. It is a minimally invasive approach, during which the energy released from the laser fiber results in destroying the pathological epithelium of the cyst, as well as the fistula's tracts.

Material and Method

It is a case series study (December 2020 – December 2021) consisting of 13 patients with pilonidal cyst. All of them were treated using the NeoV1470 Laser System with IRF (Fig. 1) (NeoLaser, Caesar, Israel). The participants were 8 men and 5 women with an average age of 24 years (Table I). The choice criteria were that the patient should have at least one fistula opening with maximum orifice size 5mm.



Fig. 1: Infinite Ring fiber

All cases were treated as day clinic. Surgery was performed with intravenous sedation and local anesthesia using lidocaine. After injecting local anesthetic, an unveiling of the cavity of the cyst is performed (deroofing). Through the opening of the fistula tract, saline solution is injected so as to ascertain its outflow through the cavity. All cases involved communication and outflow of saline solution. Consequently, probing of the fistula tract is performed along with its leaching with saline solution and hydrogen peroxide so as to remove materials that could possibly be inside it, such as hairs. After finishing leaching, cleaning of the fistula duct is performed, with the use of a brush, in order to remove granulomatous tissue and perform debridement of the wall of the fistula duct and reapply injection of saline solution under pressure until cleansing of the duct is achieved. Then the fiber is placed through the fistula opening until the edge comes out of the cyst cavity, which has been cauterized with the fiber. The cauterization of the fistula duct and withdrawal of the fiber is performed intermittently. The pulse regime we use was (8w, 3sec, 24 J/per pulse). Having cauterized the current area, the fiber is withdrawn by approximately 5mm where it is stabilized in order to cauterize the next section.

During cauterization there was on-skin saline solution rinsing at a temperature below 10 °C in order to restrict the expansion of the thermal damage. Once cauterization of the whole fistula duct is complete, small reaming of the opening is performed and the remaining of its parts is cauterized. The same procedure is repeated for every fistula in case there is more than one.



Fig. 2, 3: Immediate post-operative result and after wound healing

TABLE I - Characteristics of patients

Patient	Gender (M: man, W: woman)	Age (years)	Days of healing	Total joule administration
1	M	18	18	534
2	M	16	14	649
3	W	34	15	670
4	M	29	21	824
5	W	15	25	919
6	W	22	16	683
7	M	21	15	410
8	M	20	22	997
9	W	18	19	612
10	M	26	17	720
11	M	51	28	1230
12	M	24	18	834
13	W	19	20	910
Average		24,07	19,07	768,61

After completing the procedure, care is performed with Vaseline gauze within the open wound and compression bandaging. The first dressing change is performed by the surgical team on the third post-operative day, while the second dressing change is performed on the fifth post-operative day. All patients are prescribed antibiotics for 4 days, paracetamol 1gr x 3 until the first dressing change. Subsequently, they are monitored every seven days by the time there is complete healing of the surgical wound. None of the patients reported substantial post-operative pain. For this reason, no pain assessment scale was considered necessary. After wound healing, follows telephone contact in order to monitor patients' recovery.

Within the context of managing the condition and preventing post-operative relapse, the surgical team recommends laser hair removal from the lumbar region up to the gluteal region. Patients with intense hair growth are recommended to perform back hair removal.

Results

All the patients had successful treatment. None of the patients treated with the particular fiber had any complications or relapsed disease during the follow up period. The average duration of recovery and full convergence of the wound was 19.07 days, ranging from 14 to 28 days (Table I). As shown in Figs. 2, 3 we present the immediate post-operative overview, as well as the result after wound healing. The total energy we used per patient was not standard and depended on the size of the cyst as well as the number and the length of the fistula's tracts. The minimum energy we administered was 410 J and the maximum 1230 J with the average dosage 768,61 J (Table I).

Discussion

In the international literature have been described too many therapeutic options for pilonidal cyst therapy. Surgical techniques are separated in flaps, off-midline closure, midline closure, excision only, minimal excision only, marsupialization, drainage, endoscopic, laser and radiofrequency^{6,7}. All the studies recommend laser hair removal from the lumbar region up to the gluteal region for preventing relapse. Patients with intense hair growth are recommended to perform back hair removal. This method seems to contribute both to the prevention and the relapse of the condition^{8,9}.

Minimally invasive procedures such as laser and endoscopic treatments are applied in Greece during the last years. The use of IRF in Greece started towards the end of 2020, therefore, the series of pilonidal cyst cases presented are among the first in Greece that have been operated on using the specific fiber. Despite the limited time, it seems that the IRF is safe for treating pilonidal sinus. It is a minimally invasive method, with minimal postoperative pain and minimal postoperative tissue necrosis, which could be applied within the context of a day clinic. Monitoring of the patients will continue.

Conclusion

The PRESENT study demonstrates that the IRF, with the use of NeoV1470 Laser System, is a safe and effective minimally invasive procedure for treating pilonidal sinus disease in selective cases. It seems that the postoperative pain and necrotic tissue is less and during the 1 year follow up the relapsed disease of the study is zero.

Riassunto

Si presenta una piccola serie di pazienti affetti da cisti pilonidale, che sono stati trattati con il sistema laser NeoV1470 utilizzando Infinite Ring Fiber 600 micron (Mm) (NeoLaser, Cesarea, Israele - Infinite Ring Fiber - IRF). Questa fibra è caratterizzata da un rilascio di calore circolare a 360 gradi, una punta attiva da 4 mm con emissione a 1470 nm e fino ad ora è stata utilizzata solo per chirurgia vascolare.

SCOPO: Valutare la possibilità di utilizzo di questo sistema nel trattamento della cisti pilonidale.

MATERIALE E METODI: La casistica presentata si riferisce a 13 pazienti trattati tra dicembre 2020 e dicembre 2021. Il criterio di scelta per lo studio era che il paziente dovesse avere almeno una fistola con orificio di dimensione massima < 5 mm. Tutti i pazienti sono stati trattati in regime ambulatoriale. L'intervento chirurgico è stato eseguito con sedazione endovenosa e anestesia locale con lidocaina. Il regime di impulso che abbiamo utilizzato era di 8w, 3sec, 24 J/per impulso.

RISULTATI: Tutti i pazienti hanno avuto successo nel trattamento con la particolare fibra, e nessuno di essi ha sofferto di complicazioni o di una recidiva di malattia durante il periodo di follow-up.

DISCUSSIONE: Nella letteratura internazionale sono state descritte varie opzioni terapeutiche della terapia della cisti pilonidale. L'uso dell'uso di IRF è innovativo.

CONCLUSIONE: Possiamo concludere che l'uso del sistema laser NeoV1470 con IRF nella terapia della cisti pilonidale sembra essere un'opzione sicura ed efficace, con meno dolore e conseguenze necrotiche.

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