

The Influence of NBI Vision Over the First Follow-up Cystoscopy' Outcomes in Newly Diagnosed NMIBC Patients

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Rezumat

Influența vizualizării în NBI asupra rezultatelor primei cistoscopii de urmărire la pacienții nou-diagnosticați cu cancer vezical non-invaziv

Introducere: Un studiu retrospectiv a fost efectuat pentru stabilirea eventualului impact al cistoscopiei narrow band imaging (NBI) asupra ratei de tumori reziduale determinate în timpul primei evaluări cistoscopice în cazurile nou-diagnosticate de cancer vezical non-invaziv.

Metode: 68 de pacienți au fost descoperiți cu tumori vezicale non-invazive prin cistoscopie standard și NBI. Cistoscopia de control utilizând ambele metode a fost efectuată la 3 luni de la intervenția inițială în 67 de cazuri (un pacient pierdut din urmărire). Rata de recidive tumorale pe termen scurt a fost comparată retrospectiv cu cea obținută într-o serie similară de 67 de pacienți diagnosticați și tratați inițial numai prin cistoscopie și rezecție în lumină albă.

Rezultate: Rata de tumori reziduale determinată în timpul primei evaluări cistoscopice la 3 luni a fost mai mică în grupul de studiu care a beneficiat anterior de evaluare NBI comparativ cu grupul de control la care s-a făcut doar cistoscopie standard (4,5% versus 11,9%). La analiza localizării inițiale a leziunilor tumorale, cea mai importantă diferență a fost

evidențiată raportat la recidivele heterotopice (3% versus 8,95%).

Concluzii: Comparativ cu protocolul standard, cistoscopia și rezecția în modul NBI au influențat favorabil rezultatele oncologice pe termen scurt în cazurile nou-diagnosticate de cancer vezical non-invaziv.

Cuvinte cheie: narrow band imaging, cancer vezical nou-diagnosticat, prima cistoscopie de urmărire, recurențe pe termen scurt

Abstract

Background: A retrospective study was aimed to establish the eventual impact of narrow band imaging (NBI) cystoscopy over the short term residual tumors' rate determined during the first follow-up endoscopic control in newly determined non-muscle invasive bladder cancer (NMIBC) cases.

Methods: 68 patients were found with NMIBC by means of both white light cystoscopy (WLC) and NBI. A follow-up using both investigation modalities was performed at 3 months from the initial procedure in 67 cases (one was lost from follow-up). Results concerning the short term recurrences were retrospectively compared to those obtained in a similar series of 67 patients previously diagnosed and treated by means of classical WLC and resection only.

Results: The short term residual tumors' rate established during the first follow-up cystoscopy was lower in the study group initially benefiting from the NBI mode by comparison to the WLC control series (4.5% versus 11.9%). When drawing a parallel with the tumor map location outlined

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during the initial procedure, the most important differences were emphasized concerning other site recurrences (3% versus 8.95%).

Conclusions: NBI cystoscopy and resection displayed a substantially favorable influence over the short term oncologic outcome in newly diagnosed NMIBC cases when compared to the standard protocol.

Abbreviations: NBI – narrow band imaging; NMIBC – non-muscle invasive bladder cancer; WLC – white light cystoscopy; TURBT – transurethral resection of bladder tumors; CIS – carcinoma in situ

Key words: narrow band imaging, newly diagnosed NMIBC, first follow-up cystoscopy, short term recurrence.

Introduction

Narrow band imaging (NBI) constitutes an increasingly attractive field of interest in modern endourology (1) as it was consistently determined to ameliorate the non-muscle invasive bladder cancer (NMIBC) diagnostic accuracy (2). While the standard white light cystoscopy (WLC) was repeatedly shown to have substantial limitations in reliably observing all of the existing bladder lesions (3), comparative studies underlined the ability of NBI vision to identify a significant category of supplementary small size papillary and flat carcinoma in situ (CIS) lesions (4).

While more than one report outlined the definitely improved NMIBC patients' (5) as well as tumors' (6) related NBI detection rates when compared to classical WLC, only a quite remote part of the literature concerned itself with the eventual effect of this diagnostic alternative over the bladder cancer evolution (7). Intuitively speaking, the capacity of narrow band imaging to ensure a more precise NMIBC diagnostic leading to more tumors being resected may be expected to subsequently reduce the number of recurrent lesions found during the follow-up cystoscopies (8).

However, it is clear that only through evidence based research can an eventually positive impact of NBI with regard to the NMIBC short term residual tumors' rate be certifiably documented. Given the rather unsatisfactory bladder cancer therapeutic outcomes concerning the alarmingly frequent recurrences (8), such an oncologic progress would be most welcomed and worth further long term inquiry.

Materials and Methods

A retrospective study was conducted while aiming to establish the eventual impact of the NBI vision mode over the short term residual tumors' rate determined during the first follow-up cystoscopic control in newly diagnosed NMIBC cases. The primary endpoint of the trial was to outline a comparison to outcomes obtained in patients solely benefiting from standard cystoscopy and TURBT. Further more, the

present analysis had as secondary endpoint the evaluation of possible differences in terms of diagnostic accuracy between NBI and WLC while used as follow-up investigation modalities.

Between July and November 2014, a total of 68 patients were diagnosed with NMIBC lesions by means of both WLC and NBI cystoscopy. A follow-up using both endoscopic alternatives was performed at 3 months from the initial procedure in 67 cases (one patient was lost from follow-up). The results in terms of short term recurrences were retrospectively compared to those obtained in a similar series of 67 consecutive patients initially diagnosed and treated using classical WLC and TURBT only. The NBI and white light assessment of the bladder was applied for this control group as well during the first follow-up evaluation at 3 months after the initial NMIBC diagnostic. A similar intravesical instillation therapy was applied in both study arms, in accordance with the risk category stratification and indications set by the 2014 EAU Guidelines.

From the technical point of view, both the white light and NBI cystoscopy were performed using the Visera II video system (Olympus Europa SE & CO KG). All the procedures performed during the course of the trial were completed by the same operating team of experienced endourologists, following the same surgical protocol for each enrolled case. Conventional resection was applied for all white light visible lesions while NBI-TURBT was solely used for the additionally NBI discovered tumors.

The resulting bladder maps were matched against those outlined during the previous intervention that initially certified the bladder cancer diagnostic. Consequently, by comparison to the original tumors identified at the first NMIBC suspicion, the presence of same as well as other site recurrent lesions could be established and quantified. All the discovered lesions were of small dimensions (< 1 cm), thus making the median tumor size a rather unreliable parameter for this particular trial.

Last but not least, a diagnostic accuracy comparison between control WLC and NBI was emphasized based on the ability of the 2 types of investigation to reliably clarify the existence of short term residual tumors during the 3 months' cystoscopic check-up.

Results

The diagnostic and therapeutic protocol described above was successfully carried out for all 67 patients included in each of the two study arms.

The short term residual tumors' rate determined during the first follow-up cystoscopy was lower in the study group initially benefiting from the NBI mode assessment by comparison to the WLC control series (4.5% versus 11.9%). More precisely, at 3 months', 2 pTa and 1 CIS recurrent lesion were found in 3 different cases of the NBI group, while 11 residual tumors (3 CIS, 7 pTa and 1 pT1) were identified in patients initially undergoing classical WL-TURBT alone.

When drawing a parallel with the tumor map location outlined during the first bladder cancer diagnostic procedure, the

most important differences were emphasized concerning the other site recurrences (3% versus 8.95%). In other words, at the 3 months' cystoscopic follow-up, 2 patients of the NBI series had recurrent lesions located in different areas of the bladder mucosa by comparison to the original tumors. The same situation was underlined in 6 cases of the white light control group. On the other hand, 1 patient of the NBI series and 2 of the WLC group displayed same site residual lesions.

Moreover, while considering the ability of the 2 diagnostic choices to discover residual lesions, it was observed that the use of NBI also brought an increase in diagnostic accuracy achieved during the follow-up cystoscopic control. In fact, 2 cases of recurrence in the control group (2 pTa tumors) and 1 in the study series (1 CIS lesion) were exclusively diagnosed due to NBI findings. Furthermore, 1 patient of the WLC study arm displayed a supplementary CIS lesion exclusively observed in NBI mode. Finally, the rate of false positive results was higher for NBI resection (18.75% vs. 10%). However, the unnecessary taken biopsies were not associated with perioperative complications in any of the 2 study arms.

Discussion

While the above mentioned findings emphasized a rather optimistic perspective concerning the introduction of NBI vision in the NMIBC follow-up protocol, a parallel to the literature data in this field, however scarce, remains compulsory.

To begin with, a randomized prospective trial by Naselli et al. evaluated the impact of NBI assisted TURBT on NMIBC recurrence on a series of 148 bladder cancer cases. During the 3 months' cystoscopic follow-up, a decreased rate of short term recurrences was described among patients initially benefiting from narrow band imaging visualization by comparison to those following the conventional diagnostic protocol (10.1% versus 16.7%) (9). Although retrospectively performed, the present single center analysis involving a resembling number of cases also underlined an important difference in favor of the NBI approach (4.5% versus 11.9%) with regard to the residual lesions' rate determined at the first cystoscopic evaluation after the initial intervention.

When taking into account the recurrent tumors' location, the NBI control as adjunct investigation method besides standard cystoscopy was shown as suitable to more accurately delineating residual lesions located at other sites by comparison to the original tumor formations. From this point of view, both the literature data as well as this trial confirmed the NBI impact for this category of cases (13% (10) and 4.5%, respectively).

From the perspective of tumor detection advantages offered by applying NBI vision as part of the scheduled endoscopic follow-up in bladder cancer patients, several published trials supported the idea of superior sensitivity when compared to conventional WLC. For example, in a prospective controlled analysis enrolling 104 patients, Tatsugami et al. emphasized a substantial proportion of 26.9% of the cases in which NBI cystoscopy was able to exclusively identify supplementary tumors once WLC was completed (5). In the present study,

36.4% of the patients found to present residual lesions during the 3 months' check-up following the bladder cancer diagnostic displayed additional tumors in NBI mode, otherwise left behind by the white light assessment.

Further along the line of presumably better diagnostic accuracy, Naselli et al. analyzed a series of 47 consecutive NMIBC cases in which NBI guided biopsies were performed following a classical white light Re-TUR procedure. Most importantly, an additional proportion of 13% of the patients were identified as having high grade residual lesions solely due to the NBI-related supplementary diagnostic information (10). Results of the present trial concurred with these findings, as 4.5% of the considered cases were only discovered to have short term recurrences in light of the NBI bladder visualization.

In order to obtain an accurate picture of what a WLC/NBI diagnostic accuracy parallel implies, one must also analyze the specificity of the 2 types of cystoscopy as a relevant parameter deemed for consideration. In this particular regard, narrow band imaging seems to be in somewhat of a disadvantage, as an increased rate of false positive results when compared to conventional WLC was determined both by the available data (28% versus 21% (9)) as well as by the pathology outcomes characterizing the presently discussed study arms (18.75% versus 10%).

Based on all of the above, it may be stated that progresses concerning the short term oncologic evolution of newly diagnosed NMIBC patients achieved due to the systematic use of NBI vision created the premises for a further reduced bladder cancer recurrence rate awaiting confirmation from the future, more extensive clinical research.

Conclusions

NBI cystoscopy and resection displayed a favorable influence over the short term oncologic outcome in newly diagnosed NMIBC cases by comparison to the standard protocol. Performing NBI guided resection as an adjunct therapeutic modality to classical WL-TURBT established the basis for fewer residual lesions to be identified during the first cystoscopic control performed at 3 months from the initial intervention.

While referring to the recurrent tumors' detection, a positive impact concerning the bladder lesions' diagnostic accuracy was maintained by the NBI vision mode during the first endoscopic check-up as well. In other words, the use of the NBI evaluation was able to increase the chances for an NMIBC recurrence to be discovered while examining the bladder mucosa at 3 months from previous surgery.

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