

Selective arterial embolization for severe refractory hematuria of the urinary tract: a useful intervention to keep in mind

Abstract

Introduction and objective: Refractory hematuria is a challenge in the urological practice. Reasons for bleeding are bladder tumors, radiation cystitis, prostate cancer, kidney cancer, among others. Most patients have an advanced age, many comorbidities and are in palliative care due to advanced malignancies. In such patients an aggressive surgical treatment is not feasible and might be the last option of treatment. Selective arterial embolization has been described as part of the treatment of refractory hematuria, being a less invasive procedure with acceptable results in the long term follow up. Our aim is to report our experience with selective embolization as a treatment for severe refractory hematuria of the urinary tract, its success rate and side effects.

Methods: Medical charts of patients that underwent selective arterial embolization as the treatment of any cause of refractory hematuria between 2013 and 2021 in our institution were reviewed; 21 patients were identified. Standard selective arterial embolization was made by the vascular surgery division. Success was defined as the need of additional procedures after embolization. A descriptive analysis was performed, and all data was analyzed using the R software version 3.6.3.

Results: A total of 21 patients underwent selective arterial embolization for refractory hematuria between 2013 and 2021. The mean age was 71.3 years old and 76.2% of patients were male. Most patients, 47.6% had advanced prostate cancer, 14.3% had advanced bladder cancer, 28.6% of patients had radiation cystitis and 9.5% had advanced renal cell carcinoma. Patients underwent embolization in a mean period of 23.6 days after admission. The rate of complications after embolization was 4.7% corresponding to one patient who had a Clavien Dindo II complication. Hematuria didn't resolve in 61.9% of patients and 52.3% needed additional procedures, 27.2% required cystectomy due to failed embolization.

The mean time to cystectomy was 29.6 days. Patients who underwent cystectomy were characterized to have radiation cystitis, prostate and bladder cancer corresponding to 4.7% respectively. The success rate of embolization was 52.3% and no post embolization syndrome was noted.

Conclusion: Selective arterial embolization remains a minimally invasive option for refractory hematuria, with low rate of complications and should be part of the treatment algorithm of refractory hematuria before aggressive surgical treatment, but with a high rate of patients requiring further treatments, in up to 52.3% of cases.

Keywords: arterial embolization, refractory hematuria, urinary tract, bladder hydrodistension

Volume 11 Issue 2 - 2023

Maria A Ocampo,^{1,2} Adriana Cristancho,^{2,3}
Juan Carlos Valero²¹Division of Urology, Universidad del Rosario, Colombia²Division of Urology, Hospital Universitario Mayor Mederi, Colombia³Division of Urology, Universidad Nacional de Colombia

Correspondence: Maria A Ocampo, Division of Urology, Hospital Universitario Mayor Méderi, Universidad del Rosario, Bogotá, Colombia,
Email mariaan.ocamp@urosario.edu.co, ocampog.mari@gmail.com

Received: April 04, 2023 | **Published:** July 04, 2023

Introduction

Refractory hematuria (RH) is a challenge in the urological practice, if not treated promptly it can be life-threatening.¹ Different etiologies can explain RH, including, bladder tumors, radiation cystitis, prostate cancer, kidney cancer, among others.² Patients with RH usually have an advanced age and are in palliative care due to their oncological condition.^{1,2} Initial treatment of this condition includes bladder irrigation, irrigation with alum, formaldehyde, bladder hydrodistension and endoscopic fulguration.² The failure of these treatments can end in life-threatening RH, with limited treatments options, in many cases due to the advanced disease, surgical procedure is not feasible and should be the last option of treatment.³ Selective arterial embolization (SAE) is a minimally invasive procedure which has been described as part of the algorithm in the management of RH with acceptable results in the long-term follow-up.^{3,4} Our aim is to report our experience with SAE as a treatment for severe RH of the urinary tract, its success rate and side effects.

Materials and methods

Medical charts of patients that underwent SAE as the treatment of any cause of RH between 2013 and 2021 in our institution were reviewed; 21 patients were identified. Standard SAE was made by the vascular surgery division. Success was defined as the need of additional procedures after embolization.

A descriptive analysis was performed, and all data was analyzed using the R software version 3.6.3.

Results

A total of 21 patients underwent SAE for RH between 2013 and 2021. The mean age was 71.3 years old and 76.2% of patients were male (Table 1). Most patients, 47.6% had advanced prostate cancer, 14.3% had advanced bladder cancer, 28.6% of patients had radiation cystitis and 9.5% had advanced renal cell carcinoma. Patients underwent embolization in a mean period of 23.6 days after admission.

Table 1 Demographic characteristics

Variable	Value
Age, Median (IQR)	73 (66-41)
Gender, N (%)	
Men	16 (76,1%)
Female	5 (23,8%)
Advanced prostate cancer	47,6%
Actinic cystitis	28,6%
Bladder tumor	14,3%
Renal cancer	9,5%
Benign prostatic hyperplasia	
Hemoglobin Median (IQR)	9,1 (8,7-10,5)
Intravesical therapy, N (%)	
Alum	15 (71,4%)
Formaldehyde	5 (23,8%)
Alum + Formaldehyde	1 (4,7%)
Endoscopic Fulguration	
No	14 (66,6%)
Yes	7 (33,3%)
Blood transfusion before embolization, Median (IQR)	5 (0-7)
Hemoglobin before embolization, Median (IQR)	7,1 (7,1-7,1)
Embolized artery	
Hypogastric	17 (80,9%)
Renal segmental	3 (14,2)
Common iliac	1 (4,7%)

The rate of complications after embolization was 4.7% corresponding to one patient who had a Clavien Dindo II complication. Haematuria didn't resolve after SAE in 61.9% of patients and 52.3% needed additional procedures, 27.2% required cystectomy due to failed embolization. The mean time to cystectomy was 29.6 days (Table 2). Patients who underwent cystectomy were characterized to have radiation cystitis, prostate and bladder cancer corresponding to 4.7% respectively. The success rate of embolization was 52.3% and no post embolization syndrome or complications were noted.

Table 2 Outcomes after embolization

Variable	Value
Post-embolization hematuria resolution, N (%)	
No	13 (61,9%)
Yes	8 (38,09%)
Embolization success, N (%)	
Yes	14 (66,6%)
No	7 (33,3%)
Need for additional procedures, N (%)	
No	13 (61,9%)
Endoscopy Fulguration	3 (14,2%)
Surgery	3 (14,2%)
New embolization	1 (4,7%)
Need for cystectomy N (%)	
No	18 (85,7%)
Yes	3 (14,2%)
Time to cystectomy (Day), Median (IQR)	31 (10-48)

Discussion

With the advent of minimally invasive procedures, there's been an increased interest for SAE as a treatment for RH.⁵ There's been

described a high success rate in specific procedures such as SAE of prostatic arteries, with low morbidity compared to conventional surgical management.⁵⁻⁷

In our cohort of patients described in this paper, the success rate was lower compared to the success reported in the literature (52.3% vs 43-100%), this can be due to the selection of patients in this study, with a high variety of aetiologies of urinary tract bleeding.⁷ On the other hand, we had a low complication rate, and no post embolization syndrome was noted. Unfortunately, 3 patients required radical surgical treatment as management of RH.

Compløj et al.¹ described SAE as a safe option in terminal ill patients or in bad medical conditions, they included 25 patients and have similar characteristics to our cohort.¹ Compared to our cohort, they had a mean hospitalization time of 2 days before embolization, which is much lower compared to our study (23.6 days), however, the success rate was <40% which can be explained to the bad patient condition included in the study.¹

The lack of patients included, and the retrospective fashion are the main limitations of our study. On the other hand, the embolization agent is still controversial in the literature as its clinical impact has not been totally described. For futures investigations it would be very helpful to describe when SAE is more successful according to the aetiology of RH. We believe this study is helpful as it is a starting point to start documenting the effectiveness of SAE in the urological practice.⁸

Conclusion

SAE remains a minimally invasive option for refractory haematuria, with low rate of complications and should be part of the treatment algorithm of refractory haematuria before aggressive surgical treatment, but with a high rate of patients requiring further treatments, in up to 52.3% of cases.

Acknowledgments

None.

Conflicts of interest

Authors declare that there is no conflict of interest exists.

Funding

None.

References

1. Compløj E, Pycha A, Trenti E, et al. Transarterial embolization in the management of intractable haemorrhage. *Urologia Internationalis*. 2020;105(1-2):95-99.
2. Korkmaz M, Şanal B, Aras B, et al. The short and long-term effectiveness of transcatheter arterial embolization in patients with intractable haematuria. *Diagnostic and Interventional Imaging*. 2016;97(2):197-201.
3. Pereira K, Halpern JA, McClure TD, et al. Role of prostate artery embolization in the management of refractory haematuria of prostatic origin. *BJU International*. 2016;118(3):359-365.
4. Chen C, Kim PH, Shin JH, et al. Transcatheter arterial embolization for intractable, nontraumatic bladder hemorrhage in cancer patients: a single-center experience and systematic review. *Japanese Journal of Radiology*. 2020;39(3):273-282.
5. Uflacker A, Haskal ZJ, Bilhim T, et al. Meta-analysis of prostatic artery embolization for benign prostatic hyperplasia. *J Vasc Interv Radiol*. 2016;27(11):1686-1688.

6. Tian W, Zhou C, Leng B, et al. Prostatic artery embolization for control of gross hematuria in patients with benign prostatic hyperplasia: a single-center retrospective study in 20 patients. *Journal of Vascular and Interventional Radiology*. 2019;30(5):661–667.
7. Kim MS, Hong HP, Kang KA, et al. Superselective vesical artery embolization for intractable bladder hemorrhage related to pelvic malignancy. *Acta Radiologica*. 2020;62(9):1229–1237.
8. Delgal A, Cercueil JP, Koutlidis N, et al. Outcome of transcatheter arterial embolization for bladder and prostate hemorrhage. *J Urol*. 2010;183(5):1947–1953.