Review Article

The Clinical Applications of Mitomycin C in Urologic Diseases: A Review Article

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Abstract

**Introduction:** MMC is an antibiotic which through complex mechanisms prevent DNA synthesis and results in cell death subsequently. The first approved urological application of MMC was to treat bladder carcinoma in 1974. Since that time many studies have offered different utilization of MMC in urology. The efficacy, safety and long-term results of MMC has been shown in urological conditions however the majority of studies have concentrated on bladder cancer.

**Methods:** We searched the PubMed and Cochrane data bases by using the “Mitomycin C” and “urological applications” as search keys, limiting search to systematic reviews from 2010 till 2016 in English language.

**Results:** Overall 20 articles were according to our inclusion criteria thus we reviewed them and represented all their relevant results.

**Conclusion:** The application of MMC in urology is more commonly in bladder cancer while for ureteropelvicial carcinoma and urethral stricture is used too.

INTRODUCTION

Mitomycin-C (MMC) is an antitumor antibiotic which the first time discovered by Japanese microbiologist through fermentation cultures of the *Streptomyces caespitosus* in 1950s [1]. This alkylating agent damage DNA cross-links that inhibit the DNA replication mechanism [2]. Mitomycin is active in all phases of the cell cycle, and is the best available drug for use in combination with radiation therapy to attack hypoxic tumor cells [3]. Its main clinical use is in the treatment of the anus squamous cell cancer in combination with 5-FU and radiation therapy. Also, it is used in combination with chemotherapy for squamous cell carcinoma of the cervix and gastric, breast, and pancreatic cancer [3]. Of the special utilization of mitomycin has been in treatment of superficial bladder cancer intravesically. Because virtually none of the agent is absorbed systemically, there is little to no systemic toxicity when used in this setting [3].

The first urological application of MMC was by shida and colleagues in 1976 [4]. The molecular weight of it is 334.3 kDa and is soluble in water and organic solvents and due to its hydrophilic nature and high molecular weight usually absorbed minimally [5]. The adverse effect of MMC in systematic use has been categorized into 3 groups in the Medscape medical software, more than 10% frequent are hemolytic uremic syndrome, myelosuppresion, nausea/vomiting and fever. One to 10% frequent are stomatitis, increased serum creatinine and etc. The myelosuppresion has been the most frequent adverse effect by 64%.

METHOD

We searched the PubMed and Cochrane data bases by using the “Mitomycin C” and “urological applications” as search keys, limiting search to full text systematic reviews from 2010 till 2016 in English language.

RESULT

Seventeen out of 20 of articles were about the MMC role in managing bladder cancer and the others were about upper urinary tract urothelial carcinoma and MMC effect on this cancer. Albeit MMC has different urological applications such as prevention of urethral stricture recurrence but in the mentioned time to the knowledge we have no systematic review has been done in such fields thus we used original articles.

DISCUSSION

MMC has been utilized for curing and managing different medical conditions for example in ophthalmology disease in order to preventing scar formation, docycyostherhinostomy and debridement therapy post keratectomy [6]. In otolaryngology disease usually due to anti fibrotic properties of MMC it’s used specially in decreasing the scaring/restenosis of the airway [7].
In the gastrointestinal carcinoma for the first time MMC used in combination with 5-FU in 1974 and nowadays it is as the standard treatment for types of cancers [8]. For dermal diseases mostly in order to prevent or treatment of keloid scar formation MMC has been applied [9].

Despite its nearly bounded utilizations in which bladder carcinoma has been anciently the most common filed. It is worthful to use MMC in upper urinary tract carcinomas, bladder neck contractures and urethral strictures too but should have in mind that the results of studies sometimes are disappointing.

**REFERENCES**


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