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# *Prednisone after vasectomy reversal may improve semen parameters: one institution's experience*

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**Introduction:** Patients with suboptimal semen parameters following vasectomy reversal represent a diagnostic and therapeutic challenge. This may be caused by either partial or complete anastomotic obstruction. Despite the relatively common clinical use of corticosteroids in this patient population, data remain sparse. Thus, we set out to evaluate the safety and efficacy of prednisone after vasectomy reversal.

**Materials and methods:** A chart review was performed from January 1, 2008 to September 30, 2018 to identify men in which prednisone was used for suspected anastomotic obstruction after vasectomy reversal. Obstruction was based on sub-optimal or decreasing semen parameters and physical exam findings. A course consisted of 2 weeks of 20 mg PO daily followed by 2 weeks of 10 mg PO daily.

**Results:** A total of 89 patients were identified in which prednisone was used postoperatively. Total motile sperm counts were found to increase in the overall cohort by 10.5 million ( $p < 0.0002$ ) after a course of prednisone. On subgroup analysis, men who had a bilateral vasovasostomy (VV) or VV/vasoepididymostomy experienced an increase in total motile sperm counts by 13.4 million ( $p < 0.0012$ ) and 6.2 million ( $p < 0.014$ ), respectively. Patients who were patent at the time of prednisone treatment were more likely to see an improvement in total motile sperm counts (76.9% versus 33.3%,  $p < 0.003$ ).

**Conclusions:** Prednisone seems to be safe and potentially efficacious in men with suspected anastomotic obstruction following vasectomy reversals. Further studies are needed to more conclusively determine the treatment's effectiveness in this patient cohort.

**Key Words:** vasovasostomy, vasoepididymostomy, corticosteroids, obstructive azoospermia

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## Introduction

It is estimated that 42-60 million men worldwide undergo a vasectomy for permanent sterilization, and 3%-6% ultimately elect to have their vasectomy

reversed.<sup>1,2</sup> With utilization of the operating microscope, success rates for both vasovasostomy (VV) and vasoepididymostomy (VE) are reported to be as high as 96%-99.5% and 80%-92%, respectively.<sup>3</sup> Success after vasectomy reversal is typically synonymous with patency. There is some evidence to suggest that lower semen parameters may be needed after vasectomy reversal to achieve pregnancy, but in general a higher post reversal total motile sperm count is considered favorable for reproductive outcomes.<sup>4</sup> Subsequently, patients presenting postoperatively with suboptimal semen parameters present a diagnostic and therapeutic challenge to microsurgeons.

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Partial or complete anastomotic obstruction as a result of scarring or inflammation has been postulated to cause both diminished sperm counts and impaired motility after vasectomy reversal.<sup>5</sup> The ideal management of this scenario is not well delineated. In cases of anastomotic failure, repeat vasectomy reversal has been shown to be safe and effective.<sup>6,7</sup> Similarly, re-do operations in the setting of suspected partial obstruction may be utilized.<sup>5</sup> Otherwise, data regarding these difficult patients is sparse.

At our institution, prednisone has been given to select patients suspected of obstruction after vasectomy reversal. While intuitive given the anti-inflammatory nature of the medication, there is limited data supporting this practice despite its not uncommon clinical utilization. We set out to examine the efficacy and safety of corticosteroids in this subset of patients.

## Materials and methods

A retrospective chart review was undertaken from January 1, 2008 to September 30, 2018 to identify men who had undergone a vasectomy reversal and received prednisone postoperatively. Patients were included when there was evidence of possible scarring or inflammation. This was suspected based on lower than expected, typically defined as total motile sperm count less than 10 million, or decreases in semen parameters in conjunction with physical exam findings. For example, VV patients were considered for prednisone treatment if they were found to be azoospermic at a 6 week or 3 month semen analyses, or a decrease in

semen parameters was seen between the 6 week and 3 month semen analysis (SA). For VE patients, a course of prednisone was offered if a decrease was seen in semen parameters from 3 to 6 months, or if the patient was azoospermic at 6 months. Physical exam findings suspicious for obstruction postoperatively included the presence of a granuloma, swelling, or induration at the anastomotic site.

Exclusion criteria included lack of follow up and/or no semen analysis after steroid administration. Additionally, patients were excluded if prednisone was started immediately postop, which was attempted in patients found to have excessive scarring following vasectomy or re-do vasectomy reversals. A course of prednisone consisted of the following regimen: 2 weeks of 20 mg prednisone daily followed by 2 weeks of 10 mg daily. This was repeated in certain patients at the discretion of the provider. Statistical calculations were done using student's t-test and chi-square where appropriate.

## Results

A total of 89 patients out of a possible 368 vasectomy reversals were identified who met the inclusion criteria. The mean patient age was 40.1 years (SD 6.48), partner age was 32.45 years (SD 4.46) and obstructive interval after vasectomy was 7.80 years (SD 5.88). Of the 89 patients, 46 underwent bilateral VV, 22 bilateral VE, and 21 underwent VV/VE. The overall patency rate, defined as sperm present in the ejaculate, for all procedures in the study group was

TABLE 1. Semen analyses results pre- and post- prednisone treatment by type of operation performed

		Mean pre-prednisone (SD)	Mean post-prednisone (SD)	Change	p value
Total (n = 89)	Concentration (mill/mL)	8.4 (12.1)	16.6 (21.1)	8.2	0.002
	Motility (%)	14.3 (20.3)	23.2 (23.2)	8.9	0.008
	TMC	3.7 (8.4)	14.2 (24.3)	10.5	0.0002
VV/VV (n = 46)	Concentration	12.4 (12.8)	19.4 (20.3)	7.0	0.052
	Motility	21.9 (22.8)	32.9 (23.4)	11.0	0.025
	TMC	6.5 (11.0)	19.9 (24.9)	13.4	0.0012
VE/VE (n = 22)	Concentration	2.0 (3.6)	10.3 (19.6)	8.3	0.057
	Motility	0.8 (2.1)	8.3 (18.3)	7.5	0.064
	TMC	0.2 (0.5)	8.6 (30.2)	8.4	0.2
VV/VE (n = 21)	Concentration	6.4 (13.6)	17.3 (24.2)	10.9	0.08
	Motility	11.9 (18.1)	17.6 (17.6)	5.7	0.31
	TMC	1.2 (1.7)	7.4(10.9)	6.2	0.014

VV = vasovasostomy; VE = vasoepididymostomy; TMC = total motile count

TABLE 2. Proportion of entire cohort with improving semen parameters following prednisone

	% Azoospermic (n = 24)	% Patent (n = 65)	p value
Concentration	11/24 (45.8%)	44/65 (67.7%)	0.085
TMC	8/24 (33.3%)	50/65 (76.9%)	0.0003
Mean improvement in TMC	22.52 (SD 48.36)	15.87 (SD 21.16)	0.51

TMC = total motile count

85.7%. Prednisone was started a mean of 6.15 months (SD 4.7) postoperative, and semen analyses were typically checked 1.29 months (SD 1.89) after initiation of the steroid.

Mean total motile sperm counts demonstrated statistically significant improvements in the overall cohort (10.5 million). See Table 1 for summary of results based on the type of operation. When broken down by type of operation, statistical significance was reached in men who had bilateral VV and VV/VE with improvements of 13.4 and 6.2 million sperm, respectively. Men with bilateral VEs had a mean increase from 0.2 to 8.6 million after prednisone; however this did not reach statistical significance.

A sub analysis was performed evaluating the proportion of men with improved semen parameters based on their patency status at the time of treatment and type of operation, see Tables 2 and 3. These results demonstrate that patients who were patent at the time of initiating treatment with prednisone were more likely to see an improvement in their semen parameters for both the total cohort and those patients who underwent an VE on at least one side as compared to those men who were azoospermic.

There was one complication in a patient who had suspected adrenal insufficiency after a course of prednisone (based on lethargy); he was given an additional smaller burst and taper and his symptoms resolved. Otherwise there were no complications or side effects reported pertaining to prednisone administration.

## Discussion

Our results demonstrate that prednisone is safe and may be effective in improving semen parameters after vasectomy reversal in men with suspected scarring or partial obstruction. Additionally, while improvement of TMC was greater in men who underwent bilateral VV and among men who were patent at the time of treatment, improvement was seen in 26.3% of azoospermic individuals who underwent VE. Thus, prednisone therapy could be a reasonable treatment option in these challenging individuals.

There is a dearth of data evaluating treatment options for men with suboptimal semen parameters following vasectomy reversal. Carbone et al previously described their experience performing repeat vasectomy reversals on men with suspected partial obstruction and found improved pregnancy rates.<sup>5</sup> While our study lacks data on pregnancy rates, based on our results prednisone administration would certainly be a both less invasive and less costly initial measure.

Corticosteroids have been shown to suppress both fibroblasts and vascular endothelial growth factor, leading to a reduction and potential regression of collagen deposition and scar formation.<sup>8,9</sup> Given this potential benefit, the use of corticosteroids in urology has been of interest since the middle of the 20<sup>th</sup> century.<sup>10,11</sup> The first report investigating the use of corticosteroids in vasectomy reversals specifically dates back to 1957, in which Magoss et al describe their experience of performing VVs on dogs supplemented

TABLE 3. Proportion with improving semen parameters after prednisone s/p vasoepididymostomy

	% Azoospermic (n = 19)	% Patent (n = 24)	p value
Concentration	8/19 (42.1%)	20/24 (83.3%)	0.009
TMC	5/19 (26.3%)	18/24 (75.0%)	0.002
Mean improvement in TMC	30.29 (SD 61.61)	7.68 (SD 10.94)	0.13

TMC = total motile count

by a daily cortisone injection.<sup>12</sup> The anastomoses were performed using 5-0 silk and a splint, and no benefit to cortisone was found.

While vasectomy reversal techniques have advanced significantly since then, there are few reports of using steroids to promote patency in humans. One study from 1980 describes a series of 20 men who received prednisone after vasectomy reversal, leading to an increase in patency and pregnancy rates.<sup>13</sup> Otherwise, several studies from the same time period mention the routine use of prednisone postoperatively, although no specific utilization data was reported.<sup>14-16</sup> Additionally, around this time there was some interest in prednisone after vasectomy reversal as treatment for antisperm antibodies; however it was ultimately determined that antisperm antibodies had little effect on pregnancy outcomes.<sup>5,17,18</sup> No further studies evaluating the use of corticosteroids to promote patency after vasectomy reversal exist in the literature.

This study does possess several notable limitations. Its retrospective design predisposes it to selection bias, and the lack of a control group prevents definitive conclusions. Further, given that it has been shown that it may take as long as 6 months for sperm to return to the ejaculate after bilateral VV and up to 12 months for bilateral VE it is possible that patients' semen parameters improved simply as a result of more time.<sup>19,20</sup> Additionally, the criteria for which prednisone was started was somewhat subjective; future trials would benefit from strict inclusion criteria based on total motile sperm counts. Lastly, patients were not screened for NSAID use. While none of the included patients had routine use of NSAIDs listed on their MAR, it is certainly possible that patients took OTC anti-inflammatories which could have skewed the results. Thus, while the study is unique, further trials are necessary to conclusively determine the benefit of corticosteroids after vasectomy reversal.

## Conclusions

Our results suggest a benefit to using prednisone in cases of suspected scarring or inflammation after vasectomy reversal, especially in VVs and in patients who are patent at the time of initiating the steroid. Further well designed studies would be required to more conclusively determine if the improvement in semen parameters was due to the anti-inflammatory properties of the prednisone. □

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