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Effect of Varicocelectomy on Sperm DNA Fragmentation

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Abstract

Testicular varicocele is a widening of the veins of the pampiniform plexus depleting the gonad, and is the most regularly observed urological condition in postpubertal young men. Varicoceles are found in 15% all things considered, including 19% to 41% of men with essential barrenness and 80% of men with optional fruitlessness, and are perceived as the most widely recognized precisely correctable reason for male fruitlessness. To assess the impact of varicocelectomy on sperm atomic chromatin trustworthiness. This investigation was planned examination completed between October 2018 and January 2020 on 50 male patients with grade II-III one-sided or reciprocal varicocele grumbling of essential or auxiliary barrenness. The aftereffects of our examination indicated that the semen volume [ml3] when varicoccelectomy, demonstrated no huge change in the semen volume pre and post usable. Varicocelectomy will stay a decent choice for improving male fruitfulness possibilities in some chose persistent populaces.

Keywords: DNA Fragmentation Index , Varicocelectomy , Reactive Oxygen Species.

1. Introduction

In spite of the fact that varicoceles are once in a while observed in prepubertal young men, they are moderately basic in juvenile guys [6].

Harm to sperm DNA, for example, DNA Fragmentation Index [DFI] is related with male barrenness, with fruitless pregnancy and hereditary changes in the posterity. A few elements can prompt DNA harm, for example, changes by radiation, mistakes presented during DNA replication, ecological put-down, apoptosis and expanded creation of Reactive Oxygen Species [ROS] [12].

A worldwide gauge demonstrated that patients with varicocele have fundamentally more prominent sperm DNA harm than prolific controls, with a mean contrast of 9.84%.the recurrence of spermatozoa with divided DNA was 32.4% in patients with varicocele, a worth 2.6 occasions higher than that saw in ripe people [16].

Sperm DNA respectability four months after careful fix of varicocele. Thus watched a noteworthy improvement of every single fundamental boundary and of DFI contrasted with preoperative qualities [5].

Sperm DNA fracture was essentially expanded in patients with barrenness with varicocele in correlation with patients with ordinary outcomes on genital assessment. As of late indicated diminishes in sperm DNA fracture after varicocele fix [16].

Sperm DNA harm is multifactorial and might be because of numerous natural conditions, for example, chemotherapy, radiation, some doctor prescribed prescriptions, air contamination, smoking, pesticides, synthetic substances, heat, helped conceptive innovation [ART] planning conventions, and different pathologic conditions including cryptorchidism, disease, fever, age, contamination, leukocytospermia, and varicocele among others [33].

Raised degrees of sperm DNA discontinuity have been altogether connected with a negative pregnancy result [33].

In the event that varicocele fix can diminish raised sperm DNA discontinuity, pregnancy results ought to for the most part be improved. Semen investigation remains the principle instrument for assessment of male fruitlessness; the regular minute assessment of semen is straightforward and not costly [Komiya et al., 2014].

In the treatment of male barrenness the boundaries of the regular semen investigation don't foresee male fruitlessness or likehood of pregnancy after infetility treatment. despite the fact that computrized helped semen examination [CASA] is a practical test for observing improvement of fruitless patients after varicocelectomy; numerous instances of improved outcomes don't accomplish expanded pregnancy rate there for DNA fracture test will be attempted to answer why those patients don't accomplish pregnancy in demonstrate hatred for improved boundaries of CASA [12].

2. Aim of the work

The aim of this study is to evaluate the effect of varicocelectomy on sperm nuclear chromatin integrity.

3. Patients and methods

This study was prospective study carried out between October 2018 and January 2020 on 50 male patients with grade II-III unilateral or bilateral varicocele complaining of primary or secondary infertility.

3.1 Inclusion criteria

- Age ranged from 20-45 years old,
- Clinical varicele [grade II-III] at one side at least.

3.2 Exclusion criteria

- History of undescende testis.
- Testicular Malignancy.
- Hormonal Abnormality
- Patient Underwent Previous Varicocelectomy.
- Smokers.

3.3 Methods

Evaluation of the patients

After taking full informed consent, all patients in this study were subjected to the following:

History:

- Medical history.
- Reproductive history including:
- Sexual history
- Duration of infertility.
- Previous pregnancies.
- Previous abortions.
- Reproductive history of the female partner.

Clinical examination

- Complete general examination.
- Abdomino pelvic examination.
- Scrotal examination [in both upright and recumbent positions with and without Valsalva].

Radiological investigations including
Doppler ultra sound [US] on the scrotum.

Scrotal doppler ultrasound examination was performed using high-resolution ultrasound transducer [7.5 MHz] linear arrays with color flow Doppler imaging. Varicocele was diagnosed when at least 1 vein measured more than 3 mm in diameter and when there was evidence of retrograde blood flow either at rest or following valsalva's maneuver. Testicular size also was assessed using the US.

Pre-operative laboratory investigations including
Semen Analysis [CASA]

The semen samples were evaluated according to the world health organization [WHO] criteria

Hormonal Analysis: To exclude hormonal cause

- Serum fullicle stimulating hormone [FSH].
- Serum luteinizing hormone [LH].
- Serum prolactin hormone.
- Serum testosterone hormone,

Routine laboratory investigation

- Complete blood count [CBC].
- Coagulation profile.
- Liver function tests.
- Renal function tests.

DNA fragmentation test [Halosperm G2]
Testing for DNA damage
Sperm chromatin dispersion test [SCD] [Halosperm G2].

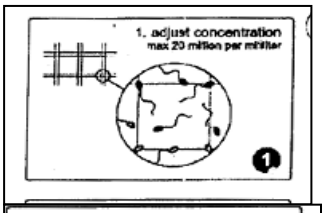
A better than ever SCD test has been created, the Halosperm ® pack. In a nutshell, an aliquot of a semen test was weakened to 10 million/mL in phosphate-supported saline [PBS]. Gelled aliquots of low-liquefying point agarose in eppendorf tubes were given in the pack, every one to handle a semen test. Eppendorf tubes were set in a water shower at 90°-100°C for 5 minutes to intertwine the agarose, and afterward in a water shower at 37°C. Following 5 minutes of brooding for temperature equilibration at 37°C, 60 mL of the weakened semen test were added to the eppendorf tube and blended in with the melded agarose. Of the semen-agarose blend, 20µL were pipetted onto slides precoated with agarose gave in the unit, and secured with a 22-by 22-mm coverslip. The slides were put on a virus plate in the fridge [4°C] for 5 minutes to permit the agarose to deliver a microgel with the sperm cells installed inside. The coverslips were delicately eliminated and the slides quickly submerged evenly in a corrosive arrangement, recently set up by blending 80µL of HCl from an eppendorf tube in the unit with 10 mL of refined water and hatched for 7 minutes. The slides were evenly submerged in 10 mL of the lysing answer for 25 minutes. Subsequent to washing 5 minutes in, a plate with bountiful refined water, the slides were got dried out in expanding groupings of ethanol [70%, 90%, 100%] for 2 minutes each and afterward air-dried. Slides might be put away at room temperature for a while in a firmly shut box in obscurity, recolored quickly for fluorescence microscopy or splendid field microscopy. For brilliant field microscopy in the improved SCD test [Halosperm® kit], 'slides were on a level plane secured with a blend of Wright's recoloring arrangement and PBS [1: 1] for 5-10 minutes with consistent wind current. Slides were quickly washed in faucet water and permitted to dry. Solid recoloring is wanted to handily envision the fringe of the scattered DNA circle coronas. The refined water, ethanol, Wright recoloring arrangement, and PBS not gave in the pack. In any case, these reagents, are cheap and simple to get [10] [13].

Instructions for use
Before starting

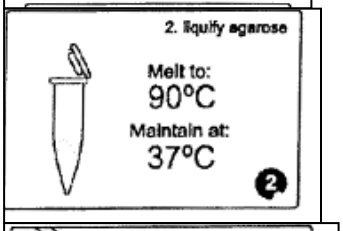
Spot the agarose screw tube [ACS] into the buoy and dissolve utilizing a water shower at 95-100°C for 5 minutes or a microwave. Aliquote 10 eppendorf lubes with 100µ1 of the agarose liquefied to use in every conclusions.

Set Solutlons 1 and 2 all the handling must be performed at room temperature [22°C].

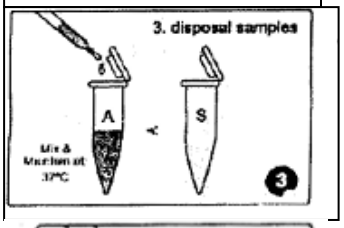
Including the sperm sample in agarose microgel



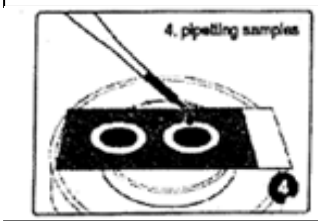
Dilute the sperm sample In an appropriate human sperm extender or PBS to a maximum of 20 million sperm per milliliter.



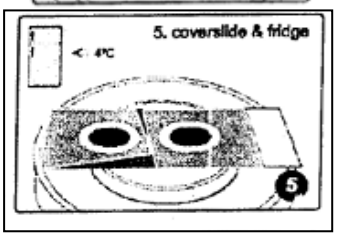
Place an eppendorf tube [EPT], Into the float and Incubate In a water bath al 95-100"C, for 5 minutes or until the agarose la fully melted. Maintain In a water bath at 37°C for 5 minutes until the temperature has equilibrated.



Transfer 50µ1 of the sperm sample to the 100µ1 agarose tube and mix gently with a pipette. Maintain in a water bath at 37°C.

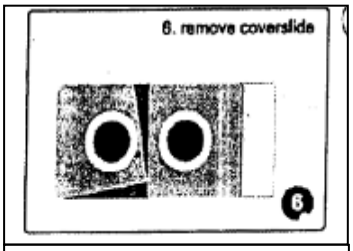


Place a drop of 8 µI of the cell suspension onto the centre of sample well ["S"]. Cover with a coverslip. Press gently, avoiding air bubbles formation. Slides must be held In a horizontal position throughout the entire process. Use the "C" wen to process a control sample.

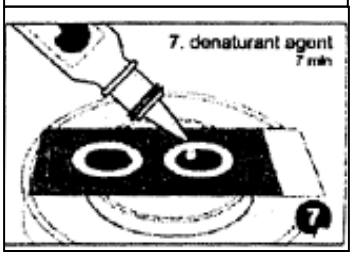


Place at the slide a cold surface [for example, a metal or glass plate precooled at 4°C] and on transfer into the fridge at 4°C, for 5 minutes to solidify the agarose.

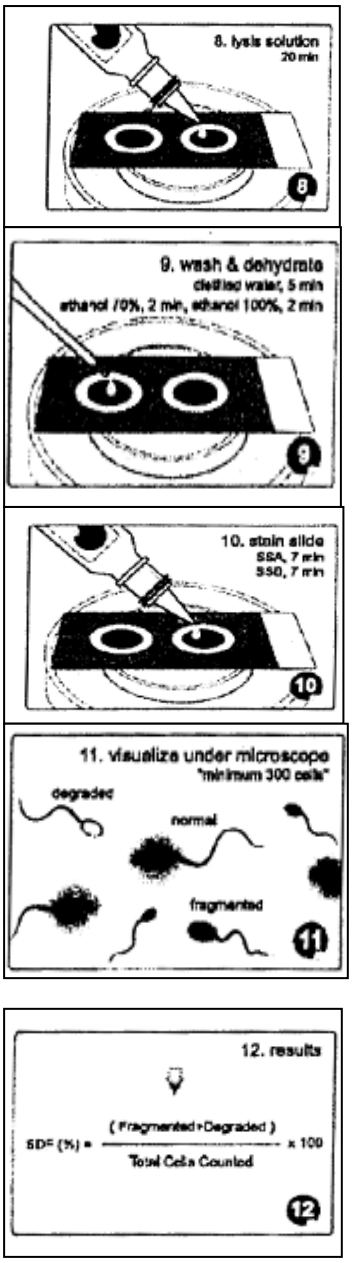
Processing the sample



Take the slide out of the fridge and remove the coverslip by sliding it off gently. All the processing must be performed at room temperature [22°C].



Place the side horizontally in an elevated position as suggested in the figure into a partl dish or similar tray
Apply Solution 1 on the well making sure it is fully covered. Incubate for 7 minutes. Completed drain by tatting and place the slide horizontally In an elevated position as suggested in the figure.



Apply Solution 2 on the well making sure. It is fully Immersed. Incubate for 20 minutes Completed drain by tilting and place the slide horizontally in an elevated position as suggested In the figure

Wash covering the slide for 5 min with bountiful refined water utilizing a dispensable pipette

Drain the water by inclining and spot the steer evenly In a raised situation as recommended In the figure

Dehydrate by flooding with 70% ethanol, utilizing a dispensable pipette and Incubate for 2 minutes.

Drain and apply 100% ethanol for 2 minutes.

Drain and permit to dry. Subsequent to drying prepared slides might be kept in slide boxes at room temperature. In a dry and dull spot for a while.

Place the slide evenly on the buoy Inside the Petri dish Apply Solution 3 on the well creation sure It is completely Immersed. Brood dish for 7 minutes.

Channel In by the inclining ngure. furthermore, place the slide evenly In a raised situation as proposed

Apply Solution 4 on the well creation sure it is completely Immersed. Brood for 7 minutes. Channel by inclining and permit to dry at room temperature.

Visualize under bright field microscopy. If the staining is too intense, the slide may be washed in tap water. If the staining is too weak. Is Immerse the slide in 100% ethanol, allow to dry and repeat step 10 for fluorescence microscopy staining, please contact the dealer.

Interpreting tile results

Calculate the percentage of sperm with fragmented DNA. The results should be evaluated taking into account all clinical and laboratory findings related to the sperm sample

Thresholds for frequency of Sperm DNA Fragmentation [SDF] have been suggested by [3] [Evanson and Wixon, Reprod Biomed Online 12:466-472, 2006].

Fig (1) Instruction of use of SCD test.

Five SCD patterns were established [12]

- Sperm cells with enormous coronas: those whose radiance width is comparable or higher than the minor breadth of the center.
- Sperm cells with medium-sized radiances: their corona size is between those with high and with little radiance.
- Sperm cells with exceptionally little estimated corona: the radiance width is comparative or littler than 33% of the minor measurement of the center.
- Sperm cells without a corona.
- Sperm cells without a halo and degraded.

Classification of DNA fragmentation.

- The first and second patterns considered as normal sperm DNA integrity while the other three are fragmented DNA.
- If less than 15% of sperms are fragmented in the high power field the specimen considered good DNA fragmentation index while if between 15% and 30% is medium DNA fragmentation index finally if more than 30% of sperms are fragmented it is considered as critical DNA fragmentation index.

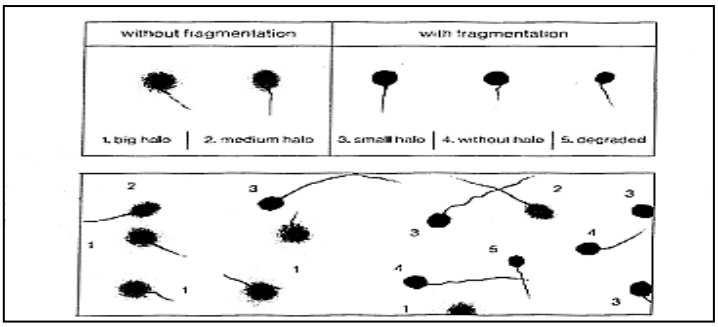


Fig (2) Patterns of SCD test**.**

- All the patients in the study underwent inguinal varicocelectomy.
- Six months post-operative laboratory investigations.
- Semen Analysis.
- DNA fragmentation test [Halosperm G2].
- Duration of follow up:
- 6 months.

3.4Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. Qualitative data were described using number and percent. Quantitative data were described using range [minimum and maximum], mean and standard deviation. The distributions of quantitative variables were tested for normality using T- test, If it reveals normal data distribution, parametric tests was applied. If the data were abnormally distributed, non-parametric tests were used. For normally distributed data, correlations between two quantitative variables were assessed using Pearson coefficient. Significance of the obtained results was judged at the 5% level [20][18].

4. Results

Table (1), shows the distribution of the studied patients regarding the age [years], the age was ranged from 23-42 years, with mean 31.5±6.25, the majority of the patients was in age group 30-35 years.

Table (1) Distribution of the studied patients regarding the age [years] .

	Number	Percent
Age group		
< 30 years	11	22.0
30-35	22	44.0
35-40	15	30.0
40-45	2	4.0
Range	23-42	
Mean	31.5	
S.D.	6.25	
Total	50	100.0

Table (2), shows the distribution of the studied patients group regarding side of varicoccele, it was found that 76.0% of the patients had bilateral varicoccele, while only 12 cases [24.0%] had varicocele on one side [left].

Table (2) Distribution of the studied patients group regarding side of varicoccele .

	Number	Percent
Side of varicoccele		
Bilateral	38	76.0
Left	12	24.0

Table (3) Distribution of the studied patients group regarding the grade of varcicoccele. The majority of grade in the two side was grade II in both left and right side, 12 cases [31.6%] was in grade I in right side, while grade III was found in 19 cases in left side and 5 cases in right sid.

Table (3) Distribution of the studied patients group regarding the grade of varicoccele .

Grade	Left "n=50"		Right "n=38"	
	Number	Percent	Number	Percent
Grade I	0	0.0	12	31.6
Grade II	31	62.0	21	55.3
Grade III	19	38.0	5	13.2

Table (4), shows the distribution of the studied patients group regarding side patient's infertility, the majority of the patients had a primary infertility [84.0%], while only 8 cases [16.0%] show a secondary infertility. The duration of infertility ranged from 1.5-6.0 years wit a mean of 2.68±1.54 years.

Table (4) Distribution of the studied patients group regarding side patient's infertility .

	Number	Percent
Type of infertility		
Primary	42	84.0
Secondary	8	16.0
Duration of infertility		
< 2 years	14	28.0
2-5	30	60.0
> 5	6	12.0
Range	1.5-6.0	
Mean±S.D.	2.68±1.54	

Table (5), shows the different Hormonal assay in the studied patients group, it was found that the hormonal assay of the studied patients group was within normal range for all hormones.

Table (5) Different Hormonal assay in the studied patients group.

Hormone	Rage	Mean±S.D.
Follicle stimulating hormone [FSH]	1.00-10.50	5.01±2.01
Luteinizing hormone [LH]	3.00-9.3	6.01±1.61
Prolactin hormone [PRL]	6.10-19.0	12.6±3.02
Testosterone	1.60-9.4	5.82±2.21

Table (6), shows the comparison between semen volume [ml3] before and after varicoccelectomy, it was found that there was no significant change in the mean semen volume pre and post operative [p >0.05].

Table (6) Comparison between semen volume [ml^3] before and after varicoccelectomy.

Semen volume [ml^3]	Pre operative	Post operative
Range	1.5-4.0	1.52-6.00
Mean	2.61	2.91
S.D.	0.91	1.03
t-test	1.25	
p value	0.136	

Table (7) Comparison between count of sperm before and after varicoccelectomy, the sperm count increased significantly post operative from pre operative [p < 0.05].

Table (7) Comparison between count of sperm before and after varicoccelectomy.

Sperm count [$x10^6$]	Pre operative	Post operative
Range	0.9-113	8.0-125.0
Mean	28.2	45.6
S.D.	31.2	33.5
t-test	2.68	
p value	0.027*	

Table (8), shows the comparison between sperm motility [%] before and after varicoccelectomy, it was found that the motility increased significantly in Progressive and decreased significantly in the form of Non Progressive [P <0.05].

Table (8) Comparison between sperm motility [%] before and after varicoccelectomy according recent WHO motility .

Motility	Pre operative	Post operative	t-test	P-value
Progressive			2.68	0.008*
Range	0.0-42.0	5-56		
Mean	17.2	26.52		
S.D.	12.6	9.52		
Non Progressive			2.44	0.016*
Range	55-96	60-92		
Mean	86.2	73.6		
S.D.	16.1	11.9		

Table (9), shows the comparison between sperm abnormal forms before and after varicoccelectomy, the abnormal forms decreased significantly post operative from pre operative [p <0.05].

Table (9) Comparison between sperm abnormal forms before and after varicoccelectomy .

Sperm abnormal forms [%]	Pre operative	Post operative
Range	55.0-100.0	60.0-91.0
Mean	86.5	80.1
S.D.	14.65	11.3
t-test	1.98	
p value	0.048*	

Table (10) Comparison between DNA fragmentation index [DFI] before and after varicoccelectomy, the DNA fragmentation index decreased significantly post operative, the good form increased to 72.0% of the cases.

Table (10) Comparison between DNA fragmentation index [DFI] before and after varicoccelectomy.

DNA fragmentation index	Pre operative		Post operative	
	Number	Percent	Number	Percent
Good	28	56.0	36	72.0
Medium	16	32.0	10	20.0
Critical	6	12.0	4	8.0
Range	5.0-51.0		5.0-32.0	
Mean	18.9		13.8	
S.D.	12.7		8.65	
t-test	3.22			
p value	0.0061*			

Table (11), shows the comparison between semen viscosity before and after varicoccelectomy, it was found that there was a significant improvement in the semen viscosity post operative, all the patients show normal semen viscosity.

Table (11) Comparison between semen viscosity before and after varicoccelectomy.

Semen viscosity	Pre operative		Post operative	
	Number	Percent	Number	Percent
Normal	44	88.0	50	100.0
Viscid	6	12.0	0	0.0
X^2	2.01			
p	0.038*			

Table [12], shows the pregnancy rate in the studied groups post operative, the pregnancy rate was 44.0% of the total studied group.

Table (12) Pregnancy rate in the studied groups post operative.

	Number	Percent
Pregnant	22	44.0
Non pregnant	28	56.0
Total	50	100.0

5. Discussion

Varicocoele is an obsessive condition related with dilatation of veins of the pampiniform plexus inside spermatic rope. Varicocoele is found in roughly 15% of everybody, except the commonness of clinical varicocoele is around 40% in men with a background marked by barrenness [2].

Albeit questionable, it is proposed that varicocoele initiates sperm brokenness through expanded scrotal temperature, reflux of blood from the spermatic vein, and impeded microcirculation 4]. In different investigations demonstrate that varicocoele fix brings about improved sperm quality and pregnancy rates in couples with clinical varicocoele [3].

During spermatogenesis, spermatid atomic redesigning and compaction is related with relocation of atomic histones by change proteins and afterward by protamines [17]. Disturbed spermatogenesis may bring about the age of spermatozoa with hindered protamination, helpless chromatin compaction, and an expanded defenselessness to DNA harm [9].

There is proof to recommend that spermatozoa of fruitless men have considerably more chromatin imperfections and DNA harm than spermatozoa of prolific men [10] [3]. The etiology of sperm DNA harm is multifactorial and most specialists have suggested that at last, oxidative pressure, deviant chromatin renovating [compaction], and unsuccessful apoptosis can bring about sperm DNA harm [1].

Regular sperm boundaries [sperm fixation, motility, and morphology] are for the most part assessed in varicocoele examines. Be that as it may, the utilization of regular sperm boundaries as result measures is debilitated by goodness of the serious extent of natural fluctuation in these boundaries and their unassuming incentive in foreseeing male ripeness potential [15].

Also, pregnancy isn't an ideal boundary to survey results of varicocoele fix as it is exceptionally affected by female variables. An improvement in sperm DNA honesty following varicocoelectomy is more believable than an adjustment in standard sperm boundaries since trial of sperm DNA harm [particularly, the SCSA] display a lower level of biologic changeability [coefficient of variety – CV in the scope of 10–30%] than traditional semen boundaries [CV in the scope of 25–55%] [8][29] 24].

Various agents have as of late analyzed the relationship among varicocoele and sperm DNA harm. These examinations have indicated that varicocoele fix is related with improved sperm DNA respectability [35]. In any case, most of these investigations need randomization and they infrequently assess more than one part of the sperm chromatin or DNA when varicocoele fix.

The point of this examination was to inspect the impact of varicocelectomy on sperm atomic chromatin honesty.

This examination was forthcoming investigation completed on 50 male patients with grade II-III one-sided or reciprocal grumbling of fruitlessness with varicocele.

In our investigation, the mean age of the examined bunch was 31.5±6.25 years, 76.0% of the cases was reciprocal and 24.0% was left side as it were. The hormonal degree of the considered patients bunch was inside ordinary reaches.

On contrasting the semen examination information pre and post usable, it was discovered that there was no noteworthy distinction among pre and post employable with respect to semen volume. The sperm tally and motility was essentially increment post usable. The sperm strange structures was essentially diminished post usable.

In this examination the DNA discontinuity file [DFI] was fundamentally improved post employable the great DNA fracture increment present usable on be 72.0% from 56.0% pre usable. The thickness of semen post usable was ordinary in all patients.

The pregnancy rate in our investigation was 44.0% for the contemplated gathering.

Testicular varicose veins cause decrease in capacity and number of the testicular cells which is reflected as a changed sperm boundary. Careful treatment is shown in men with varicocele when the semen examination shows oligospermia, asthenospermia, teratospermia, or concurrence of these variations from the norm [25]. Until now, past investigations have shown a helpful impact of varicocelectomy in subfertile men with varicocele who have helpless sperm quality. It is additionally realized that few patients with clinical varicoceles have disengaged irregularities, for example, sperm motility or morphological boundaries in the semen examination and varicocelectomy is completed in these patients too [23].

In any case, it has not been concentrated a lot of whether varicocelectomy is gainful in such patients. In this examination, we attempted to analyze the adjustments in the semen boundaries after varicocelectomy among the patients who have ordinary sperm check related with asthenospermia as well as teratospermia.

Proof proposes that men with normospermic varicocele react to varicocelectomy uniquely in contrast to those patients who have oligospermia preoperatively because of an alternate

pathophysiological component. Two significant examinations assessed the postoperative results of varicocele rectification in normospermic patients. In one, disconnected teratospermia didn't showany critical improvement following varicocelectomy; in the other, neither asthenospermia nor teratozoospermia indicated improvement [11] .

Moreover, creators guaranteed that performing varicocelectomy uncovered this gathering of patients to the danger of oligozoospermia. Our information additionally exhibited that these patients with preoperative normospermia didn't show noteworthy improvement in teratozoospermia; the main advantage of medical procedure is at sperm motility.

The conceivable clarification is that the helpless morphology saw in varicocele patients with ordinary sperm thickness may not be just because of the presence of varicoceles. Varicocelectomy in these patients may prompt an obscure adjustment or harm to the semen physiology and in this manner morphological irregularities.

With the proof of the present and past investigations, it might hence be suggested that normospermic subfertile men with clinical varicoceles and helpless sperm motility or morphology should go through helped conceptive strategies instead of careful varicocele ligation.

The watched improvement in sperm DNA uprightness following varicocoele fix further backings the speculation that varicocoelectomy improves spermatogenesis and decreases oxidative pressure. Various specialists have indicated that varicocoele is related with an expanded fundamental oxidative anxiety and that varicocoele fix may bring down the oxidative feelings of anxiety [26][27].

G.N.De Iuliis et al., [7] have proposed a two-advance theory to clarify the age of sperm DNA harm. In view of this model, oxidative pressure [2nd step] follows up on inadequately protaminated cells [i.e. cells with inadequate substitution of histones by protamines] that are produced by damaged spermiogenesis [1st step] [7]. We have recently watched a solid connection between % of HDS and sperm atomic histone H2B recoloring, proposing that % HDS is related with a fragmented histone to protamine trade during spermiogenesis [35].

In concurrence with our examination, [14] inspected the impact of microsurgical varicocelectomy on sperm DNA harm in barren men. In their investigation of 81 barren men with clinically tangible varicocele, the level of sperm with DNA fracture was fundamentally diminished a half year after medical procedure. Specifically, 18 patients indicated a preoperative DNA fracture file more prominent than 30%, and after varicocelectomy, 16 of these patients demonstrated a DNA discontinuity record under 30%.

Careful fix can be fruitful in freeing the amplified veins from the spermatic string, however the primary outcome that barren accomplices request is expanded fruitfulness. Enhancements in post-varicocelectomy sperm boundaries can undoubtedly be assessed, however it may not be conceivable to talk about complete achievement if these upgrades are not successful as far as improved live-birth rates or the degree of ART given to couples.

Oxidative pressure and sperm DNA fracture [SDF] are major contributing variables in the pathophysiology of varicocele. Despite the fact that sperm with divided DNA can fertiliseoocytes at a comparative rate to that of sperm without DNA discontinuity, it has been discovered that expanded SDF adversely influences undeveloped organism advancement and may jeopardize pregnancies in patients accepting ART [9].

There are numerous examinations demonstrating that the careful fix of clinical varicocele improves sperm boundaries, diminishes original oxidative pressure and SDF, and increments fundamental cancer prevention agents [21]. Atomic and ultrastructural assessment may speak to more delicate elective strategies for assessing the impacts of fix. Careful fix ordinarily brings about a reduction in ROS levels and SDF [31].

Different investigations have demonstrated that men with varicocele have more sperm DNA harm than control patients; this distinction was 9.84% by and large. In a meta-investigation, it was indicated that varicocelectomy diminished SDF, with normal fracture diminishing by 3.37% as contrasted and controls [32].

[3] assessed the impact of varicocelectomy on sperm chromatin and DNA trustworthiness, and recognized critical upgrades in sperm chromatin structure examine boundaries, sperm DNA uprightness, sperm focus, and dynamic motility at6months after varicocelectomy. This investigation demonstrated that varicocele-caused SDF can be turned around by varicocelectomy [10].

Late papers show a low DNA fracture file related with a higher pregnancy rate [30]. That sperm DNA harm surveyed by the Comet measure has a nearby converse relationship with live-birth rates after IVF [28]. Strikingly, in this investigation we show just because a critical backwards connection among pregnancies and the DNA fracture identified distinctly by the Halo test.

Because of the perceived need of creating and utilizing tests with solid prognostic worth, the relationship between's the Halo test and either strange sperm morphology and pregnancies features the more grounded affectability of Halo test, proposing remembering it for the normal sperm investigation board as a supplement for the underlying determination of male fruitlessness in the clinical practice.

6. Conclusion

- There is a statistically significant decrease in DNA fragmentation index [DFI] after varicocelectomy.
- There is a statistically significant increase in sperm density and motility after varicocelectomy in the examined group of patients.

- In spite of the improvement in semen parameters and DFI was not so high, but it was reflected on pregnancy rate after varicocelectomy.
- Varicocelectomy will remain a good option for improving male fertility potentials in some selected patient populations.

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