

Original Research Article

Imprint Cytology for Early Diagnosis of Prostate Cancer

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Abstract: Although the diagnosis of BPH (Benign Prostatic hyperplasia) is not difficult but the presence of early carcinoma often goes undetected. Thus imprint cytology becomes immensely valuable by helping in early and accurate diagnosis. This study was carried out in 25 patients presenting with prostatic enlargements, who were undergoing prostatectomy. The results of imprint technique were studied in detail and compared with histopathological studies. Imprints were taken in all 25 cases. There was one unsatisfactory imprint and was subsequently found to be adenocarcinoma on histopathological examination. Out of remaining 24 cases 22 cases were diagnosed correctly as benign hyperplasia and two cases were diagnosed as adenocarcinoma both by imprint and histopathology. Imprint cytology was found to be quick and reliable procedure used for the diagnosis of prostate enlargements in the present series. A correct diagnosis could be made in 24 of 25 cases (96%). There was only one case false negative result. An overall accuracy of 96% could be achieved. The time period to diagnose was considerably less in imprint cytology.

Keywords: Benign Prostatic hyperplasia; early carcinoma; imprint cytology; prostatectomy; histopathological examination; adenocarcinoma

INTRODUCTION

As the human life span has increased so have the geriatric ailments like prostate enlargement. 50% of male population over the age of 50 suffers from benign prostatic hypertrophy. However carcinoma of prostate is the commonest malignancy above the age of 65 in males. Although the diagnosis of BPH is not difficult but the presence of early carcinoma often goes undetected. Hence rectal examination is emphasized by every surgeon. However determining early cancerous lesion is a challenge. Various methods have been employed for this purpose and the one which has greatest reliability is the biopsy of prostate [2, 7]. Frozen section techniques have remained standard method of rapid diagnosis and are virtually as accurate as paraffin section studies [1]. However, frozen section facilities are not always available and histopathological biopsy section examination is time consuming. Thus imprint cytology becomes immensely valuable by helping in early and accurate diagnosis. This study was undertaken to evaluate the results of imprint cyto diagnosis in early differentiation between benign hypertrophy of prostate and carcinoma.

MATERIAL AND METHODS

This study was carried out in 25 patients presenting with prostatic enlargements, who were undergoing prostatectomy⁵. This study was carried out in the Department of Surgery and Pathology of S.G.T.B. group of hospitals. Medical college, Amritsar.

In each case detailed history was taken and thorough clinical examination was done and case was properly investigated. Relevant information was recorded as par performa attached.

EQUIPMENT USED

Glass Slides Scalpel blade No, 22. fixative solution, consisting of equal parts of ether and alcohol (95%), Filter Paper.

METHOD

After prostatectomy, the prostate gland was properly and thoroughly washed under running tap water and cut with a sharp scalpel blade [5]. The cut surface was about 1 cm square in area, this tissue was held between the index finger and thumb so that it protruded slightly beyond the finger tips and thumb. Then, it was gently pressed on the clean glass slide

without rubbing it or sliding it. Two or three such imprints were prepared on separate slides from indistant lobes.

Fixation

Wet imprints thus made were in fixed in a fixative solution i.e., a mixture of equal parts of ether and alcohol for at least 30 minutes. This minimal period was essential. However, imprints kept for longer period in the fixing solution were not damaged in any way. After removing the imprinted slides from the fixative they were washed in the tap water for one minute. Excess of stain was washed away by water and differentiation done in 1 percent acid alcohol. Blueing was done by keeping the slides in running tap water for 10 minutes and the slides were checked under microscope for proper staining. Further staining was done with Eosin for one minute. Excess of stain was removed by washing in tap water. Dehydration was done in ascending series of alcohol and finally clearing

don. In Xylol No. 1 and Xylol No. 2 for two minutes each. The slides were mounted in D.P.X. and examined under microscope. The remaining portion of the prostate was preserved in formalin solution and sent to the pathology department for routine histopathological examination. The results of imprint technique were studied in detail and compared with histopathological studies.

RESULTS

The present study was carried out on 25 cases admitted in S.G.T.B. Hospital Amritsar, with retention of urine. All cases were subjected to prostatectomy and imprint cytology were taken immediately after operation. These slides were fixed and stained with Haematoxylin Eosin and rest of the prostate tissue was preserved in Formalin Solution for histopathology examination. A definite diagnosis was made both from the imprint cytology and histopathology which were taken to be standard. Observations were as follows:

Table-1: Showing age incidence in 25 cases of Prostatic enlargements.

Age of years	B.H.P	Percentage	Carcinoma	Percentage
51-61	12	48 %	-	0 %
61-70	10	40 %	2	8%
71-80	-	-	1	4%

Out of 25 cases twenty two cases were of benign hyperplasia prostate and three cases of adenocarcinoma^{4,8}. Maximum number of cases was in the age group of 51-60 years i.e.: twelve. A next most frequent age of benign enlargement was 61—70 ye i.e. ten. Malignancy was found in three cases. The age group of malignancy was found to be common in 61

years group and only one case was recorded in the age group of 71—80 years.

This indicates maximum incidence of benign hyperplasia in age group of 51-60 years.

The youngest patient having benign hyperplasia was 55 years.

Table-2: Distribution of cases according to Syntomatology.

Presenting Complaints	No. of Patients	Percentage
Increased frequency	19	76 %
Hesitancy	16	64 %
Pain during micturition	5	20 %
Acute retention	15	60 %
Acute on chronic retention	10	40 %
Haematuria	8	32 %
Pyuria	2	8 %

All the patients presented with retention urine. 15 out of 25 cases presented with acute retention and 10 cases with acute on chronic retention. 19 patients had increased frequency either nocturnal or diurnal in early

state. Hesitancy was present in 16 cases while intermittent hematuria was present in eight cases.

CLINICAL EXAMINATION

Most of the patients had mild anemia i.e. 10—12.0 g No patient had jaundice, lymphadenopathy liver enlargements, any abdominal mass or generalized

edema. No bony tenderness or other abnormality was detected.

Table-3: Per Rectal Ex Findings of Prostate.

Grade of Prostate enlargement	No. of Cases	Percentage
i) Mild – Upper limit of Prostate could be reached	18	72
ii) Moderate – upper limit reached with difficulty		
iii) Massive upper limit could not be reached	2	8
iv)	5	20

RECTAL EXAMINATION

All the 25 cases had palpable abnormalities of prostate. All (except one doubtful case) were clinically detected as benign hyperplasia prostate except one

doubtful case. Median sulcus was palpable in all the cases except one. 72% of the prostate enlargements were of grade I, 20% of grade III and 8% of grade II.

Table-4: Other clinical findings at the time of examination

Prostate	No. of cases out of 25
Smooth surface	24
Tenderness	6
Nodular surface	1
Firm consistency	24
Hard consistency	1
Mobile mucosa	24
Adherent mucosa	1

In 24 cases out of 25 prostates were of smooth surface and one of the cases with nodular surface. Tenderness was noticed in only six cases. Consistency was firm in 24 cases. Only in one case consistency was hard in the left lobe and other lobes firm in consistency. Overlying rectal mucosa was freely mobile in all cases, but in one case the overlying rectal mucosa on left side was slightly fixed.

INVESTIGATIONS

Hemoglobin was 7-10 gm % in 4 cases, between 10-12 %, in 21 cases and between 10-42 in 21 cases. In about 12 cases, traces of albumin were detected on urine examination. One patient was suffering from diabetes. In eight, cases many RBCs were present on microscopic examination of urine. Blood urea was within normal range in 23 cases ranging from 22-39 mg% and was slightly raised in two cases from 40-42 mg%. A serum acid phosphate was done in 5 cases and was slightly raised in 3 cases while SGOT and SGPT were within normal range.

Radiography

A radiopaque calculus in the bladder was detected in one case. No bony lesion could be detected on X ray

CYTOLOGICAL FEATURES [9]

Imprints were taken in all 25 cases. There was one unsatisfactory imprint and was subsequently found to be adenocarcinoma on histopathological examination [4]. Out of remaining 24 cases 22 cases were diagnosed correctly as benign hyperplasia and two cases were diagnosed as adenocarcinoma both by imprint and histopathology [4]. The comparative diagnostic break up is as follows.

Imprint cytology

Out of 25 cases 22 cases were diagnosed as benign hyperplasia prostate and 2 cases as adenocarcinoma accurately and one case had unsatisfactory false negative imprint and thus overall 96% of accuracy was obtained with error of 4% by imprint cytology [4].

Histopathology

Out of 25 cases, 22 were diagnosed as benign hyperplasia prostate and 3 cases with adenocarcinoma [4].

CLINICAL DIAGNOSIS

Table-4: showing accuracy of the clinical diagnosis in 25 cases.

Nature of lesion	Cases diagnosed clinically	Imprints	No. of cases proved
Benign	25	22	22
Malignancy	-	2	3

Thus, clinically undiagnosed carcinoma was diagnosed by imprint cytology as well as by

histopathology with one false negative case on imprint cytology.

Table-5 Showing incidence & percentage, of error in imprint cytodiagnosis in comparison with histopathology.

Nature of lesion	Imprint	Percentage of error	Histopathology	Error Percentage
B.H.P	22	Nil	22	Nil
Adenocarcinoma	2	4 %	3	Nil

DISCUSSION

Dudgeon and Patrick probably were the first to introduce the wet film technique for comparison between the benign and malignant cells [3,6]. Since then avenues of application of cytodiagnosis in cases of inflammatory, benign and malignancy are being explored.

In the present study out of 22 cases of benign hyperplasia prostate 48 percent, presented in 51-60 years age group, whereas 40% presented in the age group of 61-70 years [8]. Two cases of malignant prostate presented in the age group of 61-70 years, and 4 per cent in the age group of 71-80 years. The youngest BHP was 55 years old and oldest 80 was years of age with benign hyperplasia prostate⁸. Similar

observation was reported in a Baiely and Love’s Short Practice of Surgery and Way Lawrence.

Retention of urine has been the most common presenting complaint in all 25 cases. Out of these, 15 cases presented with acute retention and 10 cases with acute on chronic retention, and one case with associated urinary bladder stones. 88 percent of the cases were diagnosed correctly by clinical per-rectal examination alone. Only three cases were misdiagnosed as benign instead of malignant. The present study comprises on 25 cases, accuracy of imprint cytology was determined by comparing the results of cytology with reports of histopathological examination of the enucleated prostate.

Table-6: Showing incidence and percentage of accuracy and error(Present Study).

Nature of lesion	Imprint	Percentage of error	Histopathology	Error
Benign Hyperplasia Prostate[8]	22	Nil	22	Nil
Adenocarcinoma	2	4	3	nil

Twenty two cases out of twenty five were diagnosed in benign hyperplasia prostate on imprint cytology and also on histopathology examination, but only one false negative case out of twenty five cases [8]. It is well known fact that benign lesions shed few

cells as compared to malignant lesions, where cells are loosely attached to each other. If the benign lesions contain lot of fibrous tissue, chances of getting a good smear are still less. This series compared well with that as reported by other workers.

Table-7. Showing accuracy of imprint cytology in the diagnosis of prostate enlargements.

Name of Author	Year	No. of cases	Percentage of accuracy
Dudgeon and Patrick [3,6]	1927	7	85
Kenneth [11]	1976	13	96.3
Suen and wood [9,11]	1978	22	93.8
Persent study	1988	25	96

Table: 8: Showing accuracy for Imprint cytology be Kenneth 1976 vs Dr. Mahi et al present study

Specimen	Total	Correct	False negative	False positive
Carcinoma	7	7	Nil	Nil
BHP	6	6	Nil	Nil
Kenneth et al (total)	13	13	Nil	Nil
Dr Mahi et al (total)	25	24	1	Nil

Kenneth *at al.* by imprint cytology studied thirteen cases of prostates and diagnosed carcinoma in seven cases and benign hyperplasis in six cages, thus achieving an overall accuracy of 96.3 percent [11]. There were no false positive or false negative cases (Table No. 10).

Suen and Wood prepared imprint from fresh surgical specimens, it gave an excellent cytological clarity [9]. They subjected the specimen of prostate intra operatively for rapid tissue diagnosis and drew the following results a shown in table 7. He obtained an overall accuracy of 93.6 percent with false, negative rate of 9.1 percent.

Most workers have shown that imprint taken immediately after excision of diseased tissues or organs gives great degree of accuracy absolute accuracy is by histopathology. In the present study the imprint accuracy rate was 96 percent with 4 percent false negative cases. No false positive diagnosis was made in the present cytological study [9]. From the above table it is clear that most of the authors have results ranging from 92 to 100 percent accuracy. It is clearly established that the fear of false positive reporting with imprint cytology is minimal or no false positive reporting at all provided the pathologist is competent and experienced in diagnosing cytological preparations [9].

SUMMARY & CONCLUSIONS

The present study was undertaken to evaluate the efficacy, accuracy, reliability and utility of imprint cytology in the diagnosis histopathological testing.

The following conclusions were drawn.

1. Imprint cytology is a quick and reliable procedure used for the diagnosis of prostate enlargements in the present series a correct diagnosis could be made in 24 of 25 cases (96%). There was only one case false negative result. An overall accuracy of 96% could be achieved.
2. The procedure is simple and no special equipment's required.
3. The time period to diagnose is considerably less in imprint cytology. Hence the reports are available within few minutes after the enucleation of prostate surgically as compared to 5-7 days taken by histopathology. Thus, early institution of relevant therapy in form of hormones and radiotherapy.
4. This procedure is particularly useful for diagnosis of occult carcinoma and clinically doubtful single nodule or carcinoma extending anteriorly which on per rectal enlargement may not be detected. One case which was clinically diagnosed turned out to be malignant on imprint as well as on histopathology report. Imprint cytology technique may be used for rapid diagnosis at postmortem.

Thus this procedure is eminently suitable for all conditions especially where the facilities for frozen section and histopathology do not exist [1].

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