Effectiveness of the FocalPoint GS Imaging System in Detection of Adenocarcinoma of the Gynecologic System

Rebecca Wong MD, Kevin Schofield CT, Elena Ratner MD, Malini Harigopal MD, David Chhieng MD, Angelique W. Levi MD

Department of Pathology, Yale School of Medicine, New Haven, CT

ABSTRACT

Introduction: In 2008, the FDA approved the use of the BD FocalPoint GS (FPGS) Imaging System for primary screening of BD Surepath (SP) Pap smears. Data regarding the impact of imaging systems of the FPGS imaging system in the detection of adenocarcinomas is limited (2-4). The objective of the current study was to evaluate the effectiveness of FPGS in the detection of glandular abnormalities in cervico-vaginal specimens using the SP preparation.

Design: We reviewed the cytologic diagnoses all FPGS evaluated SP processed Pap tests with histologic confirmation of gynecologic adenocarcinoma over a two year time period. Cases originally interpreted as NILM were re-screened, and the ability of the FPGS imaging system to display atypical glandular cells in representative fields of view (FOV) was assessed in false negative cases.

Results: Of a total of 155 cases obtained over a period of 26 months, 72 of these cases (46%) were interpreted as atypical glandular cells (AGC 37 [24%]), adenocarcinoma (23 [15%]), atypical squamous cells (ASCUS 9 [6%]), or a squamous lesion (LSIL 2 [1%]; HSIL 1 [0.6%]) on the SP slide. Eighty-two cases (53%) were interpreted as NILM and 1 case was interpreted as unsatisfactory. Four cases initially reported as NILM were found to contain atypical glandular cells on retrospective review. All of these cases contained atypical glandular cells in at least 1 of 10 fields of view (FOV) selected by the FPGS. The majority of the false-negative cases (3 of 4 cases) derived from endometrial adenocarcinoma and the remaining case from endocervical adenocarcinoma.

Conclusions: The results of the current study demonstrated that the FPGS was able to identify and present glandular cell abnormalities in the FOV. This finding suggests that FPGS was effective in identifying atypical glandular cells in specimens containing malignant glandular cells. Reasons that may contribute to the false-negative diagnoses during the initial screening with FPGS include a low number of atypical cells on the slide and subtle cytologic atypia.

INTRODUCTION

The FDA recently approved the use of the BD FocalPoint GS Imaging System for primary screening of BD Surepath (SP) Pap smears in 2008. Although the efficacy of the FocalPoint GS Imaging System for detecting squamous lesions is well-established, there has been relatively little data regarding its efficacy in detection of glandular abnormalities, including atypical glandular cells of undetermined significance (AGUS), adenocarcinoma in-situ (AIS), and cervical and endometrial adenocarcinoma.

The advent of the Papanicolau cervical screening has had a tremendous impact on the incidence of squamous malignancies of the cervix, with an estimated 75% decrease in mortality since 1950. It is estimated that yearly, biennial, or triennial screening can prevent greater than 90% of squamous carcinomas. On the other hand, the absolute rate of cervical adenocarcinoma, particularly among young women, has shown a documented increase across several countries over the previous decades, indicating that cervical screening has provided relatively little benefit in detection of cervical adenocarcinoma compared to cervical squamous adenocarcinoma. Similarly, population studies have shown that the protection conferred by cervical screening is significantly less for endometrial malignancies compared to cervical squamous carcinoma (1).

Few studies with histological followup investigating the BD FocalPoint GS Imaging System's ability to detect glandular abnormalities are available. There is limited data regarding the effectiveness of the BD FocalPoint GS Imaging System in detecting glandular abnormalities and almost no data regarding the screening abilities of the BD FocalPoint GS Imaging System in patients with documented gynecologic malignancies (2-4).

In this study, we investigate our institution's experience with the ability of the BD FocalPoint Imaging System to detect glandular abnormalities, and the utility of stratification, especially in relation to histologic follow up data.

Table 1. Summary of Cases with Confirmed Gynecologic Adenocarcinoma and Positive Cytologic Diagnoses Using the FPGS Imaging System

Histologic Diagnosis	No. of Cases	No. of Cases with Atypical Diagnosis or Worse using FPGS Imaging System
Endometrial Adenocarcinoma	102	41
Serous/Clear Cell Adenocarcinoma (Endometrial)	20	12
Adenocarcinoma in-situ	15	13
Adenocarcinoma NOS	9	3
Endocervical adenocarcinoma	4	3
Serous carcinoma (Ovarian)	1	0
Other *	3	0
Total	154	72

*The three cases include one case of mucinous adenocarcinoma, one case of mixed mullerian tumor, and one case of mesonephric adenocarcinoma.

Table 2. False Negative Cases Compared with Re-review Diagnoses

	Initial Diagnosis	Re-review Diagnosis	Primary Site	Reason
1	Negative for intraepithelial lesion or malignancy	Atypical glandular cells	Endometrium	Interpretation error
2	Negative for dysplastic or malignant cells	Atypical glandular cells, favor neoplasia	Endometrium	Interpretation error
3	Negative for dysplastic or malignant cells	Atypical glandular cells	Endometrium	Interpretation error
4	Negative for dysplastic or malignant cells	Atypical glandular cells, endocervical type	Endocervix	Interpretation error

MATERIALS & METHODS

Institutional review board approval was obtained for our study. We examined all FPGS-evaluated, SP-processed Pap tests with histologic confirmation of gynecologic adenocarcinoma over a two year period. A search of the CoPath database at our institution from 6/01/2009 to 8/10/2011 was conducted, including only the cases meeting the above inclusion criteria. Any cases that were originally diagnosed as NILM underwent rescreening. If any abnormalities were identified in the FOV upon rescreening, a full manual screen was conducted. In the event of an interpretive discrepancy on re-screening, the case was reviewed by a cytopathologist. Cytologic diagnoses were recorded and reviewed for each of the cases and correlated with the final histologic data. 156 cases were collected, with one case inadequate for evaluation.

RESULTS

A total of 155 cases over the course of 26 months met our inclusion criteria. The 155 women ranged in age from 23 to 90 years of age, with an average age of 60.3 years. The cases were predominantly uterine endometrioid adenocarcinoma (102 cases). The remaining cases included 20 cases of serous/clear cell adenocarcinoma, 15 cases of adenocarcinoma in-situ, 9 cases of adenocarcinoma NOS, 4 cases of endocervical adenocarcinoma, 1 case of ovarian serous carcinoma, 1 case of mixed mullerian adenocarcinoma, and 1 case of mucinous adenocarcinoma.

On original review and interpretation, 72 cases (46%) were interpreted as AGC, 23 cases (15%) as adenocarcinoma, 9 cases (6%) as ASCUS, 2 cases (1%) as LSIL, and 1 case (0.6%) as HSIL. Approximately half of the cases (82, or 53%) were originally interpreted as NILM, four of which were subsequently found to contain atypical glandular cells on retrospective review. Upon re-screening, all of these cases contained atypical glandular cells in at least 1 of the 10 fields of view (FOV) selected by the FocalPoint GS. The majority of the false negative cases (3 out of 4 cases) derived from endometrial carcinoma. The remaining false negative case derived from endocervical adenocarcinoma. One case was inadequate for evaluation.

CONCLUSIONS

- The BD FocalPoint Imaging System is adequately sensitive in detecting glandular cell abnormalities and presenting them in the FOVs in specimens containing malignant glandular cells.
- The performance of the BD FocalPoint Imaging System at our institution compares favorably to other studies of the BD FocalPoint screening systems, as well as the ThinPrep Imaging Systems.
- However, more data is still needed regarding the recognition of atypical glandular cells in patients with endocervical adenocarcinoma and rare adenocarcinomas, such as carcinosarcomas and vaginal adenocarcinomas.

REFERENCES

1. Mitchell H, Hocking J, Saville M. Improvement in protection againstadenocarcinoma of the cervix resulting from participation in cervical screening. Cancer. 2003 Dec 25;99(6):336-41.
2. Chute DJ, Lim H, Kong CS. BD focalpoint slide profiler performance with atypical glandular cells on SurePath Papanicolaou smears. Cancer Cytopathol. 2010 Apr 25;118(2):68-74.
3. Bowditch RC, Clarke JM, Baird PJ, Greenberg ML. Results of an Australian trial using SurePath liquid-based cervical cytology with Focalpoint computer-assisted screening technology. Diagn Cytopathol. 2011 Nov 1.
4 Friedlander MA, Rudomina D, Lin O. Effectiveness of the Thin Prep Imaging System in the detection of adenocarcinoma of the gynecologic system. Cancer. 2008; Feb 25;114(1):7-12.