# Sigmoidal polyp with adenocarcinoma discovered by transvaginal three-dimensional ultrasonographic virtual colonoscopy

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## Abstract

Adenocarcinoma of the colon represents the third most frequent cause of death from cancer, being surpassed only by lung and stomach cancer. Early screening and diagnosis of polyps are important for a good prognosis. Based on a clinical case, a novel approach is presented for screening of sigmoidal polyps and neoplasia using transvaginal 2D, 3D mode in women. This novel and simple technique can be used to visualize the sigmoid diverticula during routine gynecological examination via 3D transvaginal ultrasound probe.

## INTRODUCTION

A polyp represents a discrete prominence seen in the mucosa as a consequence of alterations in the epithelial or stromal components. Most colorectal cancers are believed to arise within benign adenomatous polyps that develop slowly over the course of many years. The malignant potential of a polyp is determined by its size. Polyps greater than 2 cm have a greater than 40% risk of being cancerous(Iyer *et al.* 2002). Approximately 30% of colorectal cancers occur in the sigmoid colon (Gore 1997; Livovsky *et al.* 2014). If these polyps are identified and treated early, malignant transformation can be avoided(Martinez *et al.* 2006).

Colonic neoplasia is traditionally diagnosed by either barium enema or colonoscopy. Both of these examinations require uncomfortable and sometimes intolerable bowel preparation, are invasive and have a recognized failure rate. The next modern imaging techniques are virtual colonoscopy, MRI and abdominal/endorectal ultrasonography. Furthermore, fecal occult blood testing is an inexpensive, easy-to-perform, and widely available screening tool for detection of colorectal carcinoma. Here, we report considerable revelation of a

polyp with adenocarcinoma in the sigmoid colon by transvaginal 3D ultrasound.

The sonography was considered inferior to CT and MRI in terms of their 3D volume capability. However, sonogram from newer three-dimensional sonography can now be easily compared to cross-sectional imaging scans. Moreover, the costs for a CT imaging are much higher than a 3D sonographic examination and being exposed to radiation carries a higher lifetime risk of cancer especially in the case of repeated CT scanning (Sakhel *et al.* 2013).

A 61-year-old woman underwent routine gynecological examination by transvaginal 2D and 3D ultrasonograph. On the 2D imaging, hypoechogenic focus was detected (Figure 1A) behind the uterus, in the sigmoid colon. Color doppler image showed blood flow of neoplasia (Figure 1B). 3D imaging (GE E 8 Expert; GE Medical systems, Waukesha, WI, USA, transvaginal probe: RIC 5-9-D; Default; Th 27/Qual mid 2; Mix 72/28; B 111/120; CRI 4/SRI 3). After setting the green line of the region of interest transvaginal sonographic 3D rendering of the lumen of the sigmoid revealed this finding – a polyp with a mass (Figure 1C). Application of 3D rendering provided a 3D display that we consider virtual colonoscopy. This result was confirmed by traditional colonoscopy (Figure 1D). Sigmoidoscopy revealed a polyp 2 cm in diameter in the sigmoid colon, and the diagnosis of adenocarcinoma with submucosal infiltration was derived from biopsied specimen. Our case is unique in that we applied a non-invasive diagnostic method, 3D ultrasound virtual colonoscopy, to locate and describe the sigmoidal polyp with adenocarcinoma. We acknowledge, however, that our approach, should not replace conventional colonoscopy, which is needed for definitive diagnosis, surgical planning and treatment.

Colorectal polyps are extremely common in Western countries. The main importance of polyps is their well-recognized relationship to colorectal cancer. Because most polyps are asymptomatic, they are usually found incidentally or as the result of screening(Bond 2000). The recent imaging technique is virtual colonoscopy. This technique is less successful than endorectal sonography and colonoscopy. Studies comparing virtual colonoscopy with endorectal sonography have shown superior results with endorectal sonography for the assessment of both depth of invasion and lymph node involvement(Dhamanaskar *et al.* 2006). Colonoscopy and sigmoidoscopy are the methods of choice for diagnosing colorectal neoplasia. Colonoscopy is an invasive method and it is associated with clinically relevant complications such as perforation of intestine. The accuracy of endoluminal sonography is 69–97%, whereas that of CT is 41–82% (Chiesura-Corona *et al.* 2001; Dhamanaskar *et al.* 2006). In addition, conventional MRI has proven to be inferior to endorectal sonography in the definition of the layers of the rectal wall (Dhamanaskar *et al.* 2006).

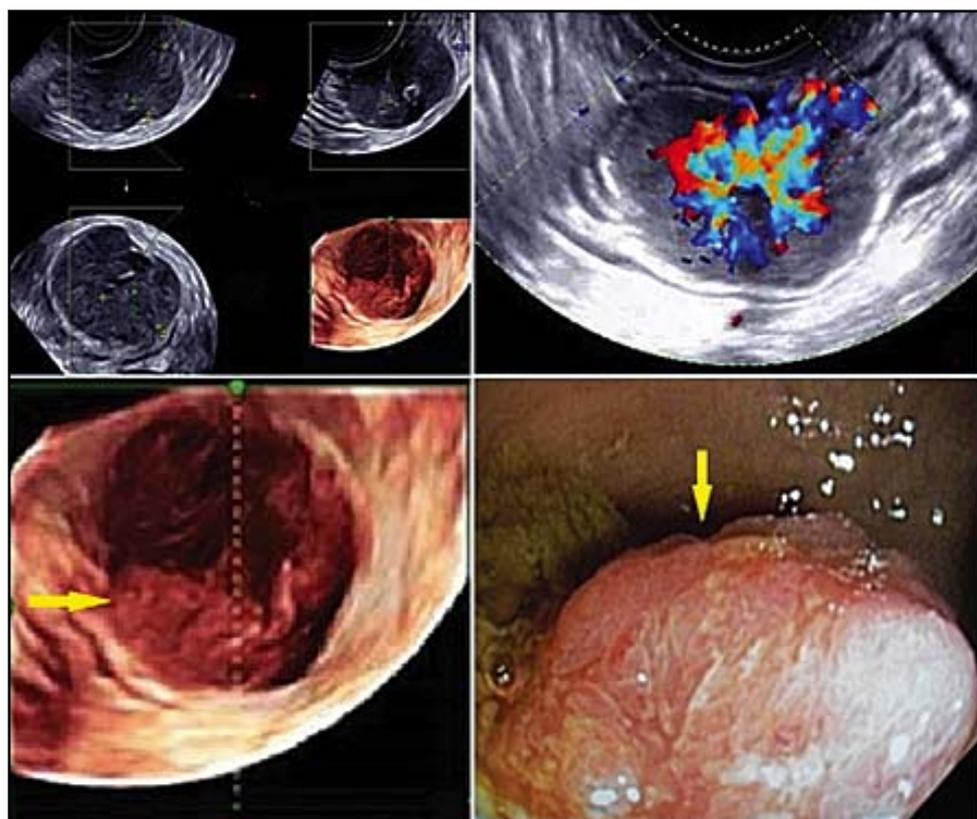The capability of sonography to resolve the layers of the rectal wall facilitates assessment of depth of invasion



**Fig. 1.** Sigmoidal adenocarcinoma discovered by transvaginal 2D, 3D ultrasound and sigmoidoscopy. A. transvaginal 2D sonogram shows polyp with adenocarcinoma, B. color doppler image confirm intense vascularity of adenocarcinoma, C. transvaginal 3D sonogram, D. endoscopic view of the sigmoid colon with adenocarcinoma.

and thereby of precise tumor stage. However, endorectal ultrasound has disadvantages.

The disadvantages include limited ability or failure to depict stenotic tumors and anal strictures and lack of or poor visualization of high rectal tumors and those situated low in the rectum, just above or involving the anal canal (Kruskal *et al.* 1997). These limitations do not apply to transvaginal sonography. Transvaginal probes operate on state-of-the-art high-end sonographic equipment unlike probes using of endorectal sonography. Transvaginal sonography (TVS) provides high resolution images of not only the uterus and ovaries but also of the portions of the gastrointestinal tracts close to the vaginal vault. Anatomically, the fixed position of the rectum deep in the pelvis directly posterior to the vagina is a prime choice for study by the transvaginal approach(Dhamanaskar *et al.* 2006). TVS has been used with success in the assessment of non-gynecologic pathologic conditions within reach of a vaginal probe such as intestinal diverticulosis(Dankovcik *et al.* 2013). Also, we used 3D ultrasound. 3D ultrasound allows to display tumor blood flow, three dimensional surface rendering, which improve identification of tumors. This noninvasive and comfortable technique is applicable for screening of colorectal cancers in women.

## REFERENCES

1  Bond JH (2000). Polyp guideline: diagnosis, treatment, and surveillance for patients with colorectal polyps. Practice Parameters Committee of the American College of Gastroenterology. Am J Gastroenterol **95**: 3053–3063.
2  Chiesura-Corona M, Muzzio PC, Giust G, Zuliani M, Pucciarelli S, Toppan P (2001). Rectal cancer: CT local staging with histopathologic correlation. Abdom Imaging **26**: 134–138.
3  Dankovcik R, Vargova V, Balasicova K, Contos P, Tkacova S, Muranska S, Dudas M (2013). Visualization of sigmoidal diverticulosis during gynecological three-dimensional ultrasound examination. Ultrasound Obstet Gynecol **41**: 231–232.
4  Dhamanaskar KP, Thurston W, Wilson SR (2006). Transvaginal sonography as an adjunct to endorectal sonography in the staging of rectal cancer in women. AJR Am J Roentgenol **187**: 90–98.
5  Gore RM (1997). Colorectal cancer. Clinical and pathologic features. Radiol Clin North Am **35**: 403–429.
6  Iyer RB, Silverman PM, DuBrow RA, Charnsangave C (2002). Imaging in the diagnosis, staging, and follow-up of colorectal cancer. Am J Roentgenol **179**: 3–13.
7  Kruskal JB, Kane RA, Sentovich SM, Longmaid HE (1997). Pitfalls and sources of error in staging rectal cancer with endorectal us. Radiographics **17**: 609–626.
8  Livovsky DM, Golomb E, Goldin E (2014). Massive polyposis of the sigmoid colon. Gastroenterology **147**: 39–40.
9  Martinez SR, Young SE, Hoedema RE, Foshag LJ, Bilchik AJ (2006). Colorectal cancer screening and surveillance: current standards and future trends. Ann Surg Oncol **13**: 768–775.
10 Sakhel K, Benson CB, Platt LD, Goldstein SR, Benacerraf BR (2013). Begin with the basics: role of 3-dimensional sonography as a first-line imaging technique in the cost-effective evaluation of gynecologic pelvic disease. J Ultrasound Med **32**: 381–388.