SENTINEL NODE MAPPING USING INDOCYANINE GREEN AND NEAR-INFRARED FLUORESCENCE IMAGING TECHNOLOGY FOR ENDOMETRIAL CANCER: A PROSPECTIVE STUDY USING A SURGICAL ALGORITHM IN INDIAN PATIENTS

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INTRODUCTION

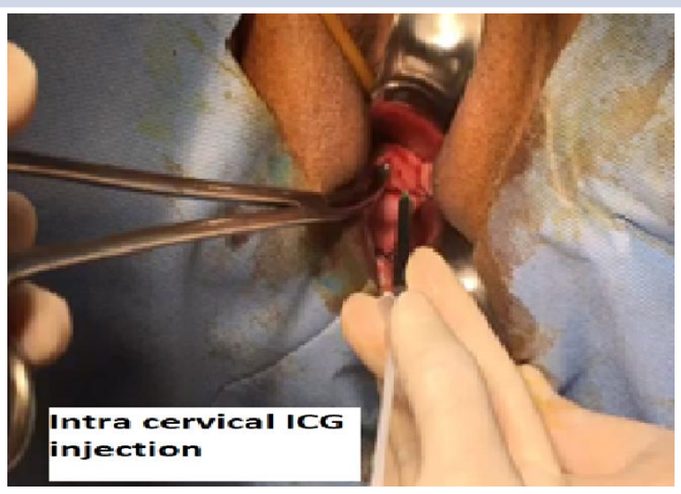
•Standard treatment of Ca Endometrium (NCCN, ESMO,FIGO,ACOG) - Hysterectomy, BSO, Peritoneal cytology, Regional lymph node assessment
•Lymph node status - Predictor of survival, Provides prognostic assessment(NCCN), Guides adjuvant treatment
•Minimally invasive approach is the standard (RCT, Cochrane).
•Systematic RPLND - Increased morbidity, Lymphoceles,Lymphedema, Neuralgia, VTE
•Over treatment in low risk case
•ICG DYE - Distinctive feature of being fluorescent when used with near infra red imaging – Simple, Radiation free, Intra operative tool for lymphatic mapping, vascularity assessment and tissue delineation.
•Da Vinci system is integrated with fluorescence imaging (Firefly Technology) and provides real time identification of anatomical structures using near infrared imaging.
•ICG dye when injected into the tissues binds to plasma proteins and emits an infrared signal when excited by laser light. The camera of the endoscope has an infra red excitation laser (800nm) and also has the ability to visualize infra red light(830nm).
•The ICG firefly technology can be utilized to visualize the sentinel lymph nodes in endometrial cancer.
•Earlier studies have shown that ICG based detection of Sentinel nodes in endometrial cancer is technically possible & has a high detectin rate of 93% & sensitivity of 87%.

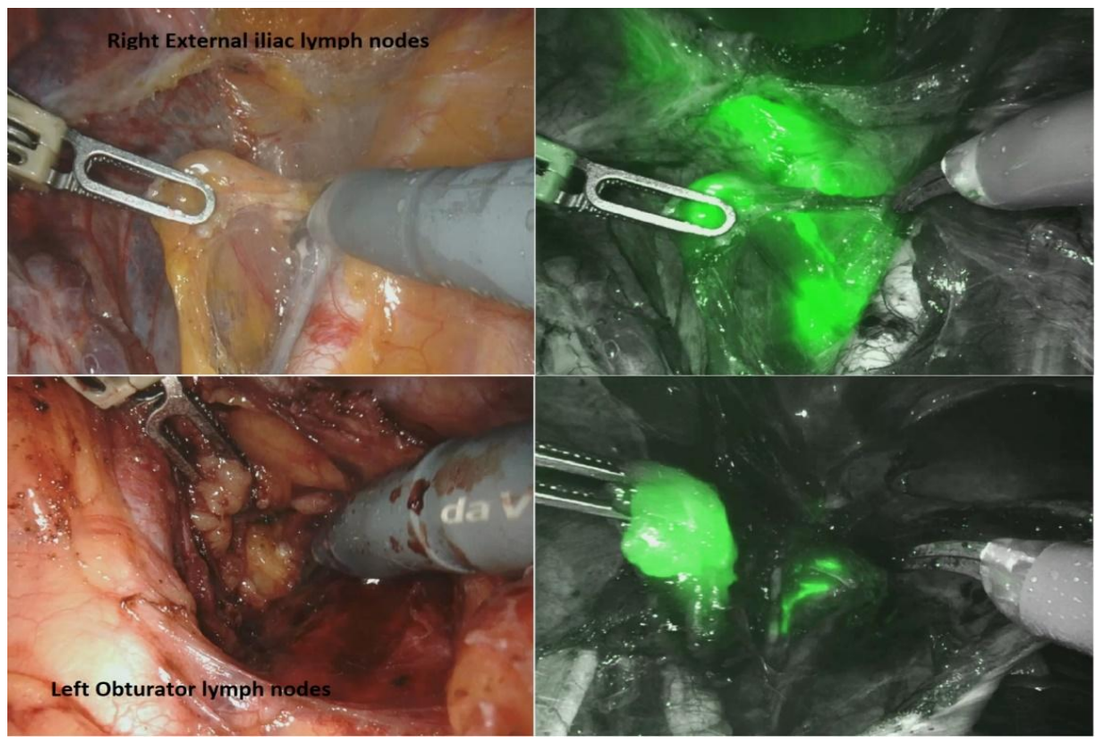
AIMS AND OBJECTIVES

•Assess the feasibility of sentinel node mapping in women with carcinoma endometrium using Da Vinci Firefly Robotic Technology
•Assess distribution of sentinel nodes with positivity rate & Accuracy of frozen section

PATIENTS AND METHODS

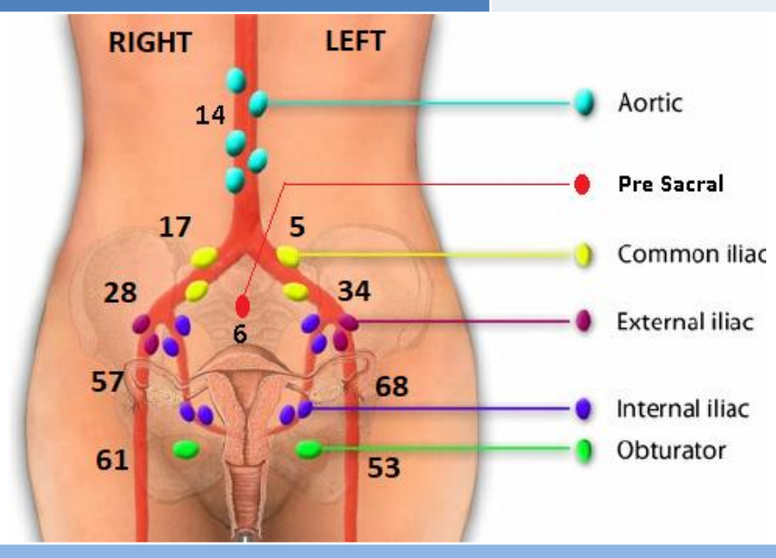
Prospective study from Jul 2020 to Jul 2022 with biopsy proven Ca Endometrium, cFIGO stage I – II of 100 patients
Robotic extrafascial hysterectomy, BSO, ICG SLN biopsy and peritoneal cytology
Da Vinci X surgical system, Same team
Technique of SLNB - Three tracers (Tc99,blue dye,ICG)commonly used, ICG with NIR imaging shown to be superior particularly in obese patients.
Three injection sites (cervix,sub endometrium,myometrium)commonly used
Cervical route has improved SLN detection rates, reproducible and accessible.





RESULTS

VARIABLE	n = 100 cases	
SLN detection rate	98/100 (98%)	
SLN mapping failure	2/100	
SLN detected patients – laterality of mapping (n=98) Bilateral SLN mapping Unilateral SLN mapping only	92/98 (93.9%) 6/98 (6.1%)	
Median number of SLNs harvested per patient (range)	4 (1-7)	
Location of SLN:	Right	Left
Pelvic: - Obturator	61(62.2%)	53(54.1%)
- Internal iliac	57(58.2%)	68(69.9%)
- External Iliac	28(28.6%)	34(34.7%)
- Common Iliac	17(17.3%)	5(5.1%)
Para Aortic:	14 (14.3%)	
Unusual site (Pre sacral):	6 (6.1%)	
No. of patients with sentinel lymph node metastasis (N+)	8/98 (%)	



DISCUSSION

Our data showed no lymph node metastases in low risk cases.
To establish the role of complete lymphadenectomy in SLN positive cases, randomised trials comparing SLN alone versus lymphadenectomy would be needed.
However if node positivity is only considered as a criteria for staging and defining adjuvant therapy then SLN status alone could suffice.
1. A comparison of sentinel lymph node biopsy to lymphadenectomy for endometrial cancer staging (FIRES trial): a multicentre, prospective, cohort study. Lancet oncology ,March 2017 - Sensitivity : 97.2%, NPV : 99.6%
Conclusion : SLN by ICG can safely replace lymphadenectomy in endometrial cancer
2. Sentinel node biopsy for the management of early stage endometrial cancer: long-term results of the SENTI-ENDO study. - Prospective multi institutional, Stage I - II endometrial cancer with cervical injection of Tc99 and blue dye, sensitivity is 100%, NPV : 100% mentioned the impact of SLNB in surgical management and indications for adjuvant therapy.
3. Sentinel lymph node biopsy in endometrial cancer: meta-analysis of 26 studies : kang et al Aim : To assess the validity of SLNB in Ca Endometrial. Sensitivity: 93%, NPV : 99%
Conclusion : SLNB has good diagnostic value in endometrium but must be interpreted with caution due to small studies.
4. Performance of sentinel lymph node biopsy in high-risk endometrial cancer : MSKCC Largest prospective single institution cohort
Aim: To determine the rate and performance of sentinel lymph node (SLN) mapping among women with high-risk endometrial cancers
NPV : 92% rose to 100% when SLN algorithm is applied.
Conclusion : SLN mapping algorithm is safe and effective alternative to systematic lymphadenectomy.
The current guidelines do not yet recommend SLN mapping as the standard of care in the staging of this malignancy, although national societies and organizations that define treatment standards are increasingly recognizing the utility of this staging approach. SLN procedure has been included in the National Comprehensive Cancer Network guidelines for early stage endometrial in highly specialized centres, experienced in SLN mapping. The Society of Gynaecologic Oncology has also recommended that SLN mapping can be performed instead of routine pelvic LND for patients with early stage endometrial cancers

CONCLUSION

ICG based NIR fluorescence SLN mapping is a promising staging strategy- accurate, high overall detection rates, tailor s adjuvant treatment, locates para aortic and atypical locations, simple, safe, practical and easily reproducible. Reduces morbidity, operative time and cost without compromising prognostic and predictive information

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