

## Risk factors for increased blood loss at total laparoscopic hysterectomy (TLH).

A retrospective review of more than 500 cases over a 12-year period from a single UK centre

**Authors: Jonathan Ferguson, Susan Addley, Subul Bazmi, Lotte Weenink, Victoria Cullimore, Giovanna Bettoli, Kirsten Townshend, Summi Abdul**

*Department of Gynaecological-Oncology, University Hospitals of Derby and Burton*

### INTRODUCTION

Total laparoscopic hysterectomy (TLH) has provided a significant alternative to total abdominal hysterectomy (TAH) and has increasingly become the preferred technique for hysterectomy procedures due to advantages over TAH such as less invasive nature, shorter recovery times and lower morbidity. These factors are also commonly associated with levels of intra-operative blood loss, or estimated blood loss (EBL). The less invasive method of TLH should in theory lead to lower EBL in hysterectomy cases however evaluation of other factors contributing to EBL is required.

### AIMS

To identify peri-operative factors associated with risk of increased estimated blood loss (EBL) at total laparoscopic hysterectomy (TLH).

### METHODS

All patients undergoing hysterectomy under the care of a single surgeon in a large UK cancer centre between 2008-2020 were identified (**N=589**). Data was collected retrospectively over **time**, on **patient factors** (age, BMI, previous surgical history, endometrial thickness, and uterine AP-diameter; as well as **surgical factors** (TLH indication, previous laparoscopic surgical history, operation duration, anaesthetic, power unit, entry technique, length of stay, post-operative complication). T-test, ANOVA and regression analysis was carried out. **Statistical significance accepted at P<0.05\***.

### RESULTS

- 589 patients** were identified.
- Mean EBL was **169.3mls** (range 10-1500mls), exceeding 500mls for significant intra-operative blood loss in **1.4%** (N=8/589).
- Mean EBL **decreased significantly over time** from 14/08/2008 – 03/10/2020 (283.3mls-144.8mls)\*.
- BMI ranges** 25.0-29.9kg/m<sup>2</sup> (166.3mls)\*, 30-39.9kg/m<sup>2</sup> (152.3mls)\* and  $\geq 40$ kg/m<sup>2</sup> (193.2mls)\* were associated with significantly greater EBL compared to 18.5-24.5kg/m<sup>2</sup> range (113.7mls).
- Uterine fundal AP-diameter** (normal range 30-50mm, EBL 154.2mls) was significantly lower when below normal range (<30mm, EBL 98.2mls)\* and significantly higher when above normal range (>50mm, 217.1mls)\*.
- EBL exhibited a positive correlation with increasing patient **endometrial thickness** ( $R^2=0.9216$ )\*.
- Intraoperatively, the EBL significantly increased when **operation duration** surpassed 120 minutes (148.6mls to 342.5mls)\*.
- For TLH procedures under general **anaesthetic** (GA), the EBL was significantly higher than under combined general anaesthetic and regional spinal anaesthetic in combination (219.3mls versus 144.4mls respectively)\*.
- Post-operatively, higher levels of EBL conferred a longer **post-operative length of hospital stay (LOS)**,  $R^2=0.8592$ , with LOS significantly increasing when EBL reached 400ml (1.7 days verses 3.0 days)\*.
- No significant relationship** was identified between EBL and patient age or previous surgical history, TLH indication, equipment used intraoperatively, power unit, entry technique or post-operative complication.

### CONCLUSIONS

The reduction in EBL over time likely reflects the learning curve associated with increasing surgeon experience in TLH procedures. BMI, uterine AP-diameter and ET as predictors of higher EBL can aid pre-operative patient counselling and to anticipate intra-operative events. The higher EBL associated with GA can be attributed to, on further analysis, more recent change in preferred anaesthetic practice to using GA in combination with spinal anaesthetic, emphasised further by concurrent increasing operator expertise. The impact of operation duration longer than 120 minutes on EBL underlines the importance of operator efficiency, and alongside the relationship between EBL and LOS, highlights the importance of meticulous haemostasis throughout TLH procedures.

| EBL (N=589)                 |                |
|-----------------------------|----------------|
| Mean                        | 169.3mls       |
| Min                         | 10mls          |
| Max                         | 1500mls        |
| Range                       | 1490mls        |
| SD                          | 161.8mls       |
| Significant EBL >500mls (%) | 8 cases (1.4%) |

*Table 1: EBL figures for patient cohort (N=589)*

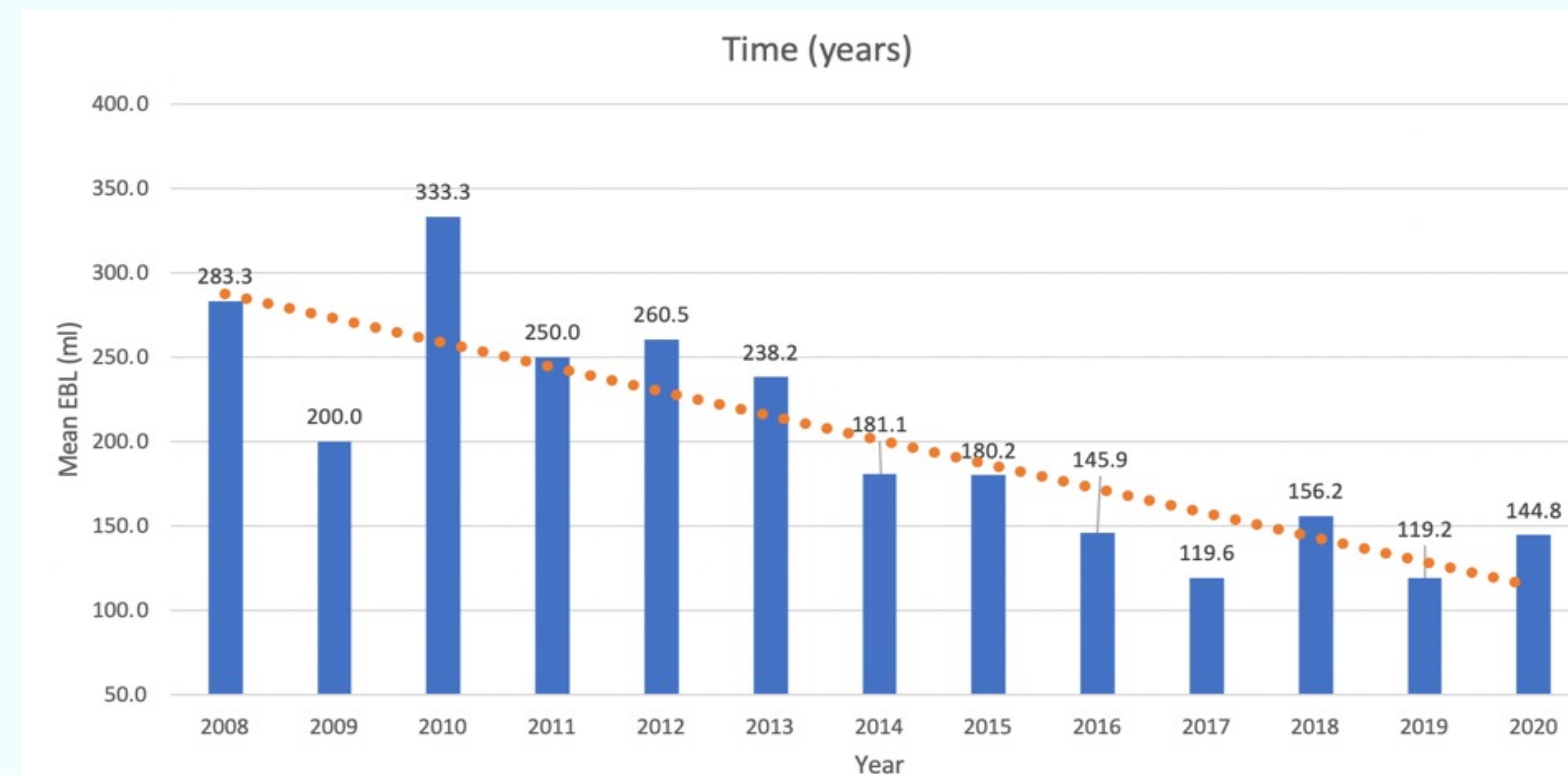


*Figure 1: The relationship between EBL over time with TLH*

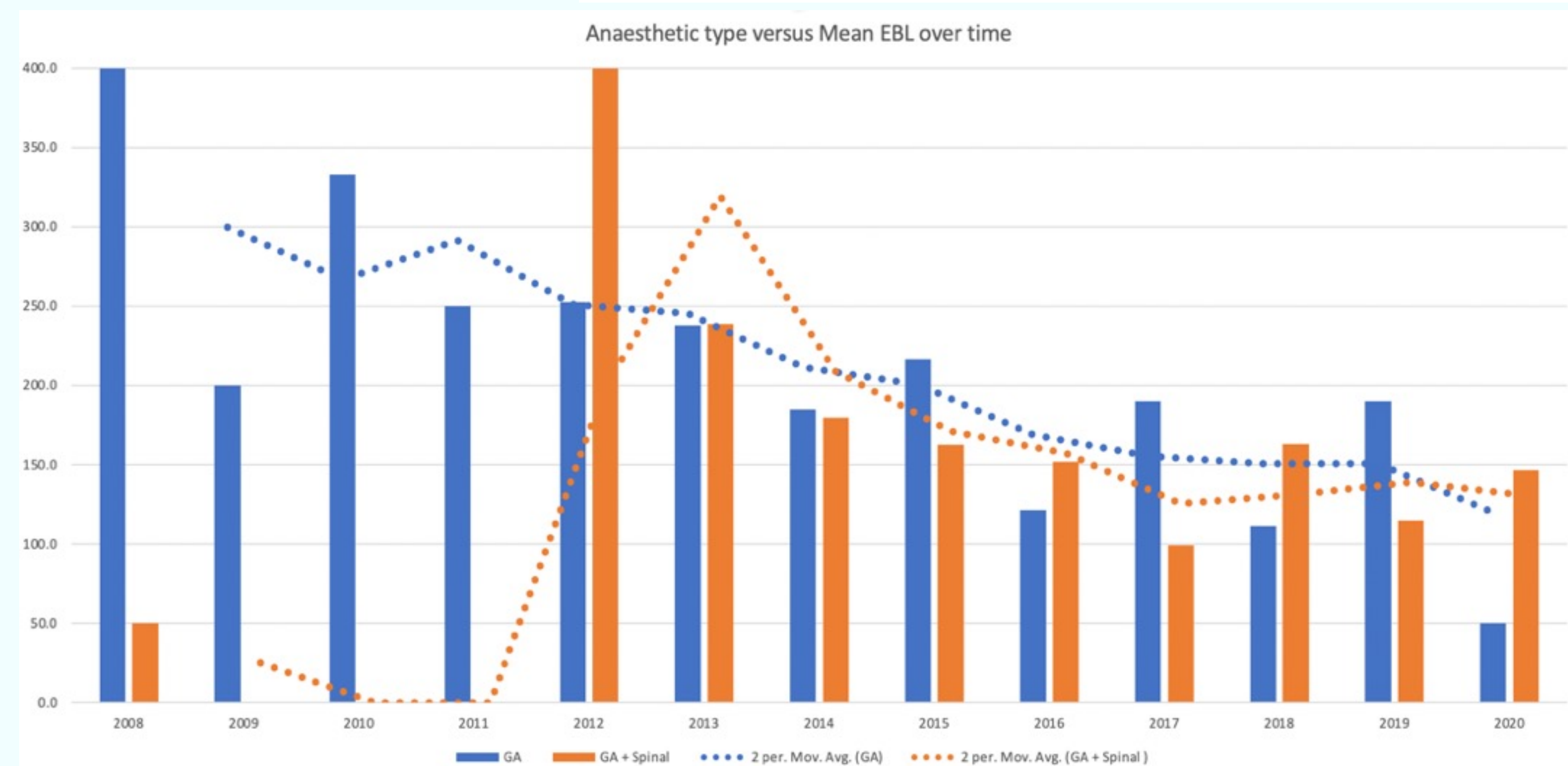


*Figure 2: The change in EBL over time accounting for type of anaesthetic (General vs General+Spinal) administered for TLH*