

Evolution of Cytoreductive Surgery for Ovarian Cancer – ‘A Walk Down the Memory Lane’

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Introduction

Worldwide, 238719 new cases of ovarian cancer are diagnosed annually with an estimated 151917 disease-related deaths [1]. Ovarian cancer is the seventh most common cancer in women across the globe. Surgery and chemotherapy has been the mainstay of treatment in ovarian cancer. The primary therapy for ovarian cancer has been adequate and complete surgical intervention to enable staging, accurate diagnosis and optimal cytoreduction [2]. There is wide disparity in the surgical success rates of primary cytoreduction for advanced ovarian cancer depending on the possession of experience, surgical skills and approach. All women with high probability of ovarian cancer should be operated by a gynaecologic oncologist after offering a preoperative consultation with them [2].

Historical Perspectives

“Sometimes a short walk down the memory lane is all it takes to appreciate where you are today” – Susan Gale

The removal of ovaries in animals has been described by Aristotle and Galen [3]. Similar reports of castration in women have been written by historians from Greece and Egypt [3]. Before the advent of the era of modern medicine, successes in the operations of the ovary – ovariectomy (incision on the ovary) or oophorectomy (removal of the ovary) were achieved accidentally and reported. Theodore Schorkopf in 1685 was the first to formally record the proposal to extirpate a diseased ovary [4]. Peyer in 1718 questioned the removal of ovarian cysts early in their formation [4]. Morgagni reported removal of an ectopic pregnancy in 1694.

Robert Houstoun performed a case on a 58-year-old woman with ovarian dropsy in 1701. He made an abdominal incision and drained the contents of the ovarian cyst. There is no description of removal of the ovary or oophorectomy. This led to the establishment of the fact that for oophorectomy, to criteria was essential – tumor had to be delivered from the abdomen and its connection with the body has to be severed [5]. Houstoun was erroneously given the credit of performing the first ovariectomy. Johannes Christian Anton Theden [6] first described the removal of ovarian cyst with its operative technique in 1771 followed by Samuel Hartman d’Escher [7] in 1807. In 1809, Ephraim Mc Dowell removed a 22.5 lb ovarian tumor in 25 minutes using a single ligature to secure the blood supply and attachment of the ovary to the uterus [8]. This lady was discharged on the fifth postoperative day. He performed 12 such operations with 33% mortality rate and could not complete one operation due to adhesions. Thereafter, many such operations were performed in the United States. Similar surgeries were being performed in Europe and England.

Lawson Tait introduced the concept of exploratory laparotomy in 1879 and described that many ovarian tumors could be benign [9]. In this era, the surgeons had no concept of improvement in survival of women after surgery for ovarian cancer. In 1934, Meigs proposed removal of as much tumor as possible in ovarian cancer to enhance the effects of postoperative chemotherapy [10]. Lynch in 1935 published a series of 110 cases of ovarian carcinoma and described a 5-year cure rate of 37% [11]. In 1940, Pemberton introduced the concept of omentectomy as a part of management of ovarian carcinoma [12].

Munnell in 1968 reported exploratory laparotomy, total abdominal hysterectomy and bilateral salpingoophorectomy with maximal surgical removal attempted even in advanced cases unless such an attempt threatened to endanger the patient’s life [13].

The Change in Surgical Paradigms

Surgery for ovarian cancer became more aggressive and extensive. In 1975, Griffiths published a landmark study demonstrating an inverse relationship between residual tumor diameter and patient survival [14]. The concept was to perform aggressive surgery followed by aggressive chemotherapy for advanced ovarian cancer. The definition of residual disease also evolved with the Gynecologic Oncology Group (GOG) started using the term ‘optimal cytoreduction’ as leaving residual disease less than 1 cm in maximal tumor diameter. Twenty-first century brought about surgical advancements and a change in paradigms for primary cytoreduction for ovarian cancer arguing that optimal surgical approaches should leave the patient with microscopic residual (i.e., R0).

Bristow [15] published a meta-analysis in 2002 where 81 patient cohorts involving 6885 patients with stage III and IV ovarian carcinoma treated with platinum-based chemotherapy from 1989 through 1998, were studied. Maximal cytoreduction was found to be the most important determinant of survival and this correlation remained significant after controlling for all other variables. The median survival time increased from 23.0 months in cohorts in which maximal cytoreductive surgery was achieved in ≤25% of patients to 36.8 months in cohorts in which maximal cytoreductive surgery was achieved in more than 75% of patients, an increase of 60%.

These results encouraged the aggressive gynecologic oncologists. Further need of accomplishing more and more with surgery in advanced ovarian cancer was gradually being established. The value of extensive upper abdominal cytoreductive procedures such as hepatectomy, full-thickness diaphragmatic resection, peritonectomy, splenectomy with distal pancreatectomy is now becoming increasingly popular. Women with advanced ovarian cancer undergoing primary cytoreductive surgery have an extended survival.

Conclusions

Ovarian cancer is a deadly disease. Surgery for ovarian masses has evolved since time immemorial - from castration in female animals to ovariectomy and oophorectomies, from simple abdominal operations to exploratory laparotomies and radical surgery. The maximal effort at cytoreduction is the key principle. The need of the hour is to have gynaecologic oncologists with experience and expertise in dealing women with ovarian cancer.

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