Selected Summaries

Laparoscopic smoke and Covid-19: The debate continues

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SUMMARY

In this narrative review Mintz *et al*. analysed the available literature to address whether compared to laparotomy, laparoscopy is associated with lower risk of transmission of Covid-19 through surgical smoke. Of the 1098 articles identified, they selected 50 for critical appraisal (26 consisted of recommendations, 3 guidelines, 1 cohort study, 1 randomized controlled trial and 19 prospective or retrospective studies). Of these 50 studies, 6 were in favour of laparotomy, 13 favoured laparoscopy and 31 were inconclusive. The authors came to several conclusions that surgical smoke created during laparoscopy and laparotomy has the same composition; there is no evidence of isolation of SARS-CoV-2 from surgical smoke or its transmission through it; and finally, laparoscopy is safer than laparotomy if proper smoke evacuation measures are taken.

COMMENT

The widespread devastation caused by the Covid-19 pandemic has created a sense of panic and fear not only in the general population but also among healthcare workers, leading to adoption of certain safety measures despite the lack of definite evidence. One of these was cessation of laparoscopic procedures. Many centres in India and other countries stopped performing laparoscopic procedures in favour of conventional open surgery, to avoid the possible spread of infection from aerosolized peritoneal fluid or blood. Over the past few months, there has been an abundance of literature on this debate, but there has been no robust evidence to support either approach.

The authors cited a recent report which showed that though the smoke produced in laparoscopy and laparotomy contained similar particulate matter, the cumulative count of particles was higher in laparoscopy 10 minutes after starting the procedure.[1] An important point to remember is that in laparoscopy, unlike laparotomy, energy devices are used almost all the time during dissection, even while dissecting avascular planes. In open surgery, small oozes due to blunt dissection are taken care of by direct pressure with surgical sponges. However, this is difficult in a minimal access approach, where a bloodless field is paramount for successful dissection. Thus, though reports show that smoke produced by newer energy devices is considerably less compared to that of conventional cautery,[2] the sum total of smoke and particulate matter generated during laparoscopy may be higher than that of open surgery. Furthermore, the high pressure of pneumoperitoneum may cause wider spread of these aerosols than in open surgery. However, comparative studies quantifying the spread of aerosols in laparoscopic and open surgery are difficult, if not impossible, to design.

The authors rightly state that there is no scientific evidence till date of isolation of Covid-19 from surgical plumes and aerosols. However, lack of evidence cannot be considered as negative evidence. A case report from Italy published online has proven that peritoneal fluid may contain the virus.[3] Isolation of the virus from blood of infected patients has also been reported.[4] When combined with experiments showing viability of the virus in aerosols for hours, these evidences do render some plausibility to the hypothesis that Covid-19 can be transmitted through surgical smoke. The simple equipment described by Cicuttin *et al*. in a recent publication may aid in the collection of aerosols for isolation of the virus.[5]

Another important point discussed by the authors is an uncertain causality between the presence of viral particles and the reported virus transmission to treating healthcare professionals. In this regard, the authors discuss two publications, wherein human papillomavirus (HPV) infection got transmitted to healthcare professionals (three gynaecologists and one nurse in one study and two otorhinolaryngologists in another) from HPV-positive patients that they operated upon.[6,7] The authors argue that in these studies, regardless of being case reports or case series, causality was not established. However, it is important to understand that these case reports of HPV transmission to operating surgeons satisfy two of Koch's three postulates of establishing causality: the operated patients had documented HPV positivity and the surgeons thereafter developed HPV infection, which was again microbiologically documented. Unfortunately, no clinical study would be ethical that would satisfy Koch's third postulate of isolating the virus from the affected surgeon and injecting into a new subject to evaluate the development of infection. Yet another point discussed by the authors was whether stability of an organism could be correlated with viability. Again, no clinical study design can answer this question unless the organism or fragments isolated are inoculated into laboratory animals in an experimental setting.

The authors' conclusion that laparoscopy is safer than open surgery is not based on robust scientific evidence. However, there is no strong evidence to the contrary as well. Therefore, until there are well-designed studies to compare the two approaches, it is better to exercise similar caution during every surgical intervention, at least till the pandemic is substantially controlled. Although the use of smoke evacuators can possibly make laparoscopic surgery safer than laparotomy in the current scenario, these adjuncts are not available in most government

and private hospitals in India and other developing countries. Even today, most surgeons in developing countries, especially in small towns and district hospitals, do not adopt healthy smoke evacuation procedures and intermittently open the trocar stopcocks to vent surgical smoke to reduce haziness of vision during prolonged laparoscopic surgeries.

In conclusion, based on the current available evidence, it would not be justifiable to make a blanket statement that laparoscopic mode may be safer than open surgery to prevent the spread of Covid-19 infection. Such statements may urge surgeons as well as patients to opt for laparoscopic surgery, without going into the details of the necessary adjustments such as the use of smoke evacuators. The authors' emphasis on the use of proper smoke evacuation systems as mentioned in the table in their publication is in line with the principles of 'safe surgery' and will definitely make any surgical intervention (laparoscopy or open) safer.

Conflicts of interest. None declared

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